geology, ecology, mining service

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DOCUMENTATION

WITH THE CONTENT AND SCOPE ACCORDING TO ANNEX 4
PURSUANT TO § 8 of LAW No. 100/2001 Coll.,
ACT ON ENVIRONMENTAL IMPACT ASSESSMENT
AS AMENDED

NAME OF THE PROJECT

Recyklace odkaliště Chvaletice – Trnávka (Recycling of the Chvaletice - Trnávka tailings)

ANNOUNCER

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Reported by: Ing. Daniel Bubák, Ph.D. **Date:** September 2023

The official version of the ESIA documentation is only the one published in the system of the Ministry of the Environment – link: https://portal.cenia.cz/eiasea/detail/EIA_MZP499?lang=cs

This document provides an unauthorised translation of the ESIA documentation.

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AOPK - Agency for the Protection of Nature and Landscape
AS – Accoustic Study
BaP - benzo(a)pyreneques
BAT – Best Available Techniques
BPEJ – soil ecological unit
BREF - Reference Document on Best Available Techniques
c.a. - cquadastral area
CGS - Czech Geological Service
CHVPS – protected outdoor space
CHLU – Protected deposit area
ČHMÚ - Czech Hydrometeorological Office
CSU - Czech Statistical Office
DoKP - affected landscape area
DP - mining area
EIA=ESIA - Environmental Impact Assessment
ECHVA – Power Plant Chvaletice
EO - equivalent population
EVL - European site of European importance (Natura 2000)
HC - mining activity
HEIS VUV - Hydroecological Information System of the Water Research Institute
HPV - groundwater level
IČZÚJ - identification number of the basic territorial unit
IS - information system
Kes - coefficient of ecological stability
KKZ - Commission for Stock Classification
KPZ - Commission for projects and final reports
KSÚS - Regional Administration and Maintenance of Roads of the Central Bohemian Region
KÚSK - Regional Authority of the Central Bohemian Region
LBC - Local Biocentre
LBK - local biocorridor
LCI - significant landscape element
LNA – light goods vehicles
MIT - Ministry of Industry and Trade
MPAA - Protected Area of Natural Water Accumulation
MUK - Municipal Unitary Junction
MZD - ameliorative and strengthening trees
MZdr - Ministry of Health
MŽP - Ministry of the Environment (MoE)
NA - trucks
NEL - non-polar extractable substances (petroleum substances)
NL - non-pollutants
No. - order number
no.h.p. - hydrological order number
NO2 - nitrogen dioxide
NP - nature park
NPÚ - National Heritage Institute
NRBK - transregional biocorridor
NV - government regulation
OA - passenger cars
OBÚ - District Mining Office
OkÚ - district office
OOP – Nature Coservation Authority
OPRL - regional forest development plan
OPVZ - protection zone of a water source
ORP - municipality with extended competence
PFA - Protected Deposit Area
PHM – fuel

PHO – noise control measures
PM10 - suspended particulate matter (dust) with particle size less than 10 µm
PM2.5 - suspended particulate matter (dust) with a particle size of less than 2.5 µm
PO - bird area (Natura 2000)
POPD – operating, preparation and mining plan
PP - natural monument
PR - nature reserve
PSaR - plan for rehabilitation and reclamation
PUPFL - land intended to fulfil forest functions
RBC - regional biocentre
RBK - regional biocorridor
ŘSD - Road and Motorway Directorate
SaR - Sanitation and Reclamation
SCI - Site of European importance
SECM - system of contaminated sites registration
SHZ – old noise pollution
SOKP - Ring Road around Prague
SPA - Protected Landscape Area
SPA - Specially Protected Area
THP – technical-economic employee
TNA – Heavy trucks
TTP - permanent grassland
TZL - solid pollutants (particulate matter)
UAA - area of interest
ÚAP - Territorial analytical documents
ÚP - municipal zoning plan
ÚPSÚ - settlement plan
ÚSES - territorial system of ecological stability
VB – calculation point
VKP – Important landscape element
VPS - public utility structure
VUMOP - Research Institute of Melioration and Soil Protection
WHO - World Health Organization
WWTP - wastewater treatment plant
ZP - environment
ZPF - agricultural land fund
ZUR - principles of territorial development

INTRODUCTION

Recapitulation of the EIA process

The notification of the intention "Recycling of the Chvaletice – Trnávka tailings " was prepared in July 2020 and handed over to the Ministry of the Environment (MoE), as the competent authority, to carry out the screening procedure. The competent authority received the notification of the project on July 30, 2020. The notification of the intention met the requirements under Section 6 (1) of the Act. 7 of Act No. 100/2001 Coll (the Act in this document). Therefore, the competent authority initiated the screening procedure on 4 August 2020 by sending a notification of the intention to the affected territorial self-governing units and authorities through a letter with ref. no. MZP/2020/710/3123. On 5 August 2020, details regarding the notification of the intention was officially published on the notice board of the Pardubice Region.

According to § 6 of the Act, the public, the affected public, the relevant authorities and the affected territorial self-governing units could send a written statement on the notification to the competent authority within 30 days from the date of publication of the information about the notification on the official notice board of the Pardubice Region, i.e. by 4 September 2020. Comments sent after the deadline will not be taken into account by the competent authority.

On 5 January 2021, the Ministry of the Environment published the conclusion of the screening procedure issued on 21 December 2020 under ref. no. MZP/2020/710/5065 pursuant to Section 7 (1) of the Act. 5 of the Act. In the screening procedure, it is stated that the project "Recycling of the Chvaletice – Trnávka tailings" fulfils the wording of points No. 19 (Equipment for the production of non-ferrous raw metals from ore, concentrates or secondary raw materials by metallurgical, chemical or electrolytic processes.) and No. 79 (Determination of the mining area and the proposed surface mining of minerals on an area from the set limit (25 ha) or with the capacity of the proposed surface mining from the set limit (1 million tonnes/year)) category I of Annex No. 1 to of the Act, within the meaning of § 4 Art. 1 lit. a) of the Act. According to § 4 para. 1 lit. a) of the Act, this intention is always subject to assessment in the full scope of the Act, i.e. obligatory.

According to the request of the Ministry of the Environment, it is necessary to consider and address all comments and conditions that are stated in the received comments on the notification within the documentation. Furthermore, the Ministry of the Environment states the following requirements for the content and scope of documentation, as well as the evaluation of specific environmental impacts:

1. *Prepare a noise and dispersion study, taking into account the relevant requirements in the received statements.*
2. *Within the dispersion and noise study, propose technical and compensatory measures to prevent the deterioration of air pollution and noise pollution in the area.*
3. *Prepare an assessment of the impacts on public health, taking into account the conclusions of the noise and dispersion study and also with an emphasis on manganese issues.*
4. *Prepare a thorough assessment of the site in terms of surface and groundwater protection, taking into account the relevant requirements in the comments received.*
5. *To prepare a preliminary assessment of the impact of the project on the water bodies concerned in accordance with the requirements arising from Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for Community*

action in the field of water policy, the so-called "Water Policy" of the European Parliament. Water Framework Directive.

6. *To take into account the interests of state monument care and compliance with the interest in the protection of cultural and historical values.*

Within the introductory chapter, the required detailed settlement of the received statements is carried out.

On 27 January 2023, documentation was submitted to the Ministry of the Environment in the scope of Annex No. 4 to the Act. On 14 February 2023, the Ministry of the Environment sent the documentation to the affected territorial self-governing units and concerned authorities for review and comment. Simultaneously, information about the documentation was made available in the EIA Information System on the website of the www.mzp.cz/eia under the MZP499 project code, in the documentation section. The public, the affected parties, the relevant authorities and the concerned territorial self-governing units could send their written comments on the submitted documentation within 30 days from publication date on the official notice board of the concerned region. Information about the documentation was published on the official notice board of the Pardubice Region on 16 February 2023. The deadline for submitting written observations expired on 20 March 2023. This was followed by expert consultations of the Ministry of the Environment at various levels on the possibilities of solving the location of the assessed project in the existing above-limit noise burden of the affected area (which was the main content of the statement of the Regional Hygiene Station of the Pardubice Region based in Pardubice (hereinafter referred to as the "Regional Health Authority") on the submitted documentation of the project). By letter dated 26 May 2023, RNDr. Oldřich Vacek, CSc., holder of authorization within the meaning of Section 19 of the Act, was entrusted with the preparation of an assessment on the environmental impacts of the project. The documentation, including all the comments received, was delivered to the expert opinion processor on 26 May 2023 together with all other relevant documents.

On 29 May 2023, the Ministry of the Environment received a written proposal from the author of the assessment (expert opinion) for the return of the submitted documentation with a recommendation. The proposal suggests completing the acoustic study and related parts of the submitted documentation, concerning the characteristics of the risks of the project to public health. The primary reason for the proposal to return the documentation is the above-mentioned statement of the KHS, which requires the submission of a completed acoustic study, a comprehensive evaluation of the project's impacts on public health and the associated documentation derived from it (to the extent of the justification applied in the statement). In its statement, the Regional Health Authority makes a total of 14 comments, the most serious of which is the statement that the noise pollution limit has been exceeded in the area affected by the project for a long time and the location of the project in question would contribute to the deterioration of the current situation, albeit with a minimal contribution, which cannot be accepted.

On the basis of the above, on 19 June 2023, the Ministry of the Environment returned the documentation for revision pursuant to Section 8 (1) of the Act on the Functioning of the Czech Republic by letter ref. MZP/2023/710/2155. 5 of the Act. After studying the documentation, the submitted statements and the recommendations from the expert opinion processor, which aligns with the Ministry of the Environment's perspective, the Ministry of the Environment came to the conclusion that a proper assessment of the environmental impacts of the project cannot be carried out without revising documentation. It should be returned for revision in order to remedy the deficiencies identified. At the same time, the Ministry of the Environment concluded that these deficiencies cannot be remedied or dealt with within the EIA assessment or opinion. According to the above-mentioned letter of the Ministry of the Environment, it is necessary to rework the documentation in relation to all comments of the Regional Health Authority and also to include relevant comments and requirements from other received comments on the project's. Given the nature of the submitted project, it is necessary that the revised documentation includes, in particular, the following information and aspects:

1) Acoustic study

To complete the acoustic study consistently according to the requirements of Regional Health Authority. It is necessary to finalize the proposal of such measures (and to demonstrate their effectiveness) that will ensure that the project, by its location in the area, will not contribute to the deterioration of the current situation in the surrounding protected outdoor areas, which exceeds the level of tolerable load within the meaning of the provisions of Sections 11 and 12 of Act No. 17/1992 Coll., on the Environment, as amended.

2) Health risk assessment

In connection with the completion of the acoustic study according to the requirements of point No. 1, the resulting assessment of the impacts on public health resulting from this study should be adequately completed. The documentation also mentions a small emission of hydrogen sulphide (theoretically max. 68 kg/year) and the dispersion study evaluates the emission contributions of hydrogen sulphide in the vicinity of the project. However, this fact is not reflected in the assessment of the impact of the project on public health. It is necessary to deal with this fact by extending the assessment of the impact of the project on public health to include hydrogen sulphide, or to clearly demonstrate in the documentation that the hydrogen sulphide emission is insignificant from the point of view of the effects on public health.

3) With regard to a number of comments and reservations made in the comments on the dossier received pursuant to the provisions of Paragraph 8(3) of the Act, 3 of the Act to prepare a detailed settlement of all these statements.

The above requirements must be incorporated into the individual chapters of the documentation (especially in Part D.II.). In this context, it is also appropriate to pre-empt a chapter at the beginning of the revised documentation (or you can choose the form of a separate annex to the revised documentation), where it will be described and summarized how the individual comments were taken into account or dealt with, including references to the relevant chapters or pages of the revised documentation or its annexes.

According to the request of the Ministry of the Environment, the following text of the introduction includes articles dealing with the settlement of statements. Sorting is done according to topicality. Therefore, the comments on the documentation are settled first, followed by the settlement of the comments on the notification of intent, which remain in the same form as in the version of the documentation from January 2023.

With regard to the fact that the fundamental comments on the EIA documentation were made by the public health protection authority, i.e. the Regional Hygiene Station of the Pardubice Region based in Pardubice (hereinafter referred to as "KHS"), in particular to evaluate the impact on the acoustic situation, maximum attention was paid to noise impacts within this revised documentation. To identify the sources of noise and calculate the noise burden of the project, an acoustic study was prepared (Králíček, 2023), which is Annex No. 1 to this documentation. This acoustic study was substantially updated and reworked in addition to the revised documentation, taking into account the requirements of the KHS.

The revised acoustic study was discussed with the KHS within the so-called preliminary discussion in accordance with Section 15 of Act No. 100/2001 Coll. The outcomes of the discussion clearly indicate the acceptance and consideration of KHS comments. On 30 August 2023, KHS commented on the revised documentation as part of the preliminary hearing under ref. no. KHSPA 16593/2023/HOK-Pce, with 6 specific comments made as part of this statement. The acoustic study was still found to be insufficient for assessment by the public health protection authority and a request for its further refinement was applied. As part of the further revision of the acoustic study, the 6 comments from KHS were taken into account. The acoustic study underwent another preliminary discussion. KHS commented on the acoustic study modified in this way on 26 September 2023 under ref. no. KHSPA 19030/2023/HOK-Pce (see Annex H5). The statement indicates that KHS comments have been integrated into the acoustic study, and no additional comments were provided by KHS.

In particular, the updated acoustic study includes the re-evaluated and updated acoustic parameters of the plant's equipment according to the project documentation for the zoning decision (DUR), which specifies the parameters of the plant's equipment (TRACTEBEL ENGINEERING a.s., from 06/2023). The computational model is therefore updated, acoustic modifications of individual devices are proposed and increased sound insulation of buildings in the area of the processing plant and mining area is proposed. This took into account the requirement of the KHS of the Pardubice Region, on the basis of which the assessed project must not in any way worsen the unsatisfactory (above-limit) acoustic situation in the municipality of Trnávka, even if the noise from the existing noise sources in the area would reach the hygienic limit LAeq,1h = 40 dB for the night time in Trnávka. This proves that after taking into account the noise sources of the assessed project, the value of 40 dB will not increase by even 0.1 dB for the entire duration of the project. The updated acoustic study has been adequately incorporated into the relevant chapters of this documentation, in particular chapters B.III.4., C.I.10 and D.I.3. Requirements for measures to minimise noise effects are given in Chapter D.IV.

On the basis of the revised acoustic study, the impact on the acoustic situation, and thus the related impact on public health, was evaluated as insignificant.

Settlement of comments on documentation

The following commented on the documentation:

1. The town of Chvaletice, 14/03/2023
2. Municipality of Řečany nad Labem dated 14/03/2023
3. Municipality of Trnávka, 20/03/2023
4. Municipality of Kladruby nad Labem dated 20/03/2023
5. Municipality of Labské Chrčice dated 18/03/2023
6. Municipality of Selmice from 20/03/2023
7. Regional Authority of the Pardubice Region, Department of the Environment and Agriculture, dated 13/03/2023
8. Přelouč Municipal Authority, Department of the Environment, dated 20/03/2023
9. Regional Public Health Authority of the Pardubice Region, based in Pardubice, dated 14/03/2023

10. Czech Environmental Inspectorate, Regional Inspectorate Hradec Králové, dated 27/02/2023
11. District Mining Authority for the Hradec Králové and Pardubice Regions dated 23/02/2023
12. Povodí Labe, s.p., Department of Water Resources Care, dated 09/03/2023
13. statement within the Ministry of the Environment (550 – Department of State Administration VI of 10/03/2023; 610 – Department of Adaptation to Climate Change of 20/02/2023; 630 – Department of Species Protection and Implementation of International Commitments of 08/03/2023; 640 – Department of Water Protection of 10/03/2023; 660 – Department of Geology dated 21/03/2023 (sent after the deadline for comments); 710 – Department of Environmental Impact Assessment and Integrated Prevention, IPPC and IPR of 17/03/2023; 720 – Waste Department of 07/03/2023; 750 – Department of Environmental Risks and Environmental Damage, dated 15/02/2023; 810 – Department of Energy and Climate Protection of 20/02/2023; 820 – Department of Air Protection of 16/03/2023; 840 – Department of Environmental Policy and Sustainable Development, 14/03/2023)
14. Chvaletice Power Plant (through the authorized representative JUDr. Petr Zákoucký, LL.M.) dated 20/03/2023
15. Jan Beran delivered on 20/03/2023

The following article presents individual statements and their relevant comments. *The response of the dossier processor is shown in italics*. In case the issue has already been responded to on other points, there is a link to this response in the text.

1. City of Chvaletice, ref. CHVA-4035/20/STAR/ZMa of 14.3.2023

The town of Chvaletice has the following requirements for the above-mentioned documentation:

a) Mining mechanisms and trucks designed to travel in the tailings area.

The author of the dispersion study states that the process of obtaining the raw material and its preparation taking place in the area of the tailings is mainly associated with emissions of nitrogen oxides from the engines of mining machinery and from the movement of trucks in the area of the tailings, as well as with technological emissions of dust particles from this technique. As mining will take place for several decades, we require the use of mining mechanisms and trucks with diesel drives, which are environmentally friendly, and over time replace this technology with diesel drives with more efficient technology or other environmentally friendly drives. Mining and other mechanisms, which are listed on page 34 of the dispersion study and will probably be used at the beginning of mining, will be gradually replaced by more modern technology. This will reduce the amount of NOx and particulate matter produced, which is not negligible.

Continuous renewal and modernization of machinery and rolling stock is natural. With regard to the fact that it also brings significant operational savings, it is also in the interest of operators of this technology. Due to the dynamic development of electric drives, the replacement of diesel machines and means of transport with electric ones is not excluded. The dispersion study is prepared for current (yet modern) technology and *its replacement with more advanced machines will therefore mean more favourable effects on air quality.*

b) Insulation layer on remediated and reclaimed land

On page 44 of the SPSR it is stated that the insulation layer will be made up of a material with insulating properties with a certificate or an insulating foil will be used. In the statement on the comment of the municipality of Řečany nad Labem, letter a. l) (page 19 of the main document) it is stated that a foil-only solution will be used to insulate the hoppers.

The documentation only considers a solution with a film. An older version of the SPSR text has been corrected in the revised documentation.

c) Acoustic study – Hornická čtvrť

The acoustic study shows that the hygienic limit for the night time in Hornická čtvrť may be exceeded during the operation of the new processing plant. It is good that the noise study requires acoustic monitoring to be carried out according to the Acoustic Monitoring Plan after the start of a new plant and in the event of exceeding the limits, it also proposes appropriate measures.

We demand that the city be continuously informed about the results of acoustic monitoring, both in Hornická čtvrť and in Chvaletice!

That measure was considered insufficient from the point of view of the public health protection authority. Therefore, the technical solution of the project was redesigned in order to reduce noise. The revised acoustic study shows that the hygienic noise limits will be observed in Hornická čtvrť.

Nevertheless, acoustic mentoring is proposed, and the requirement to inform about its results has been added to Chapter D.IV.

d) Emission monitoring

The city requires to be continuously informed about the results of monitoring (measurement) of individual emissions from the processing plant and the tailings area, where mining, remediation and reclamation will take place.

The project represents a source of air pollution for which emission monitoring is not proposed by law.

Due to the nature of the source, monitoring of emissions from mining is generally not possible and is not carried out at any surface mining site in the Czech Republic. Emissions will be mainly from exhaust gases of the mechanization used, or emissions from resuspended dust. It was the minimization of this type of emissions that was emphasized in the documentation.

From the point of view of air protection, it is therefore more important than monitoring to set the operating conditions, which will be carried out within the approval of the operating rules of the air pollution source. Measures to minimise the impact on air quality are listed in Part D.IV. This is a preliminary draft of measures. These measures will be further refined in the next phases of the preparation of the plan. As part of further project preparation and permitting processes, the impact on air quality will also be the subject of proceedings for the issuance of binding opinions pursuant to Section 11 (1) of the Act. 2 lit. b) (for the determination of the mining area, for the zoning procedure, *for the mining activity permit) and the decision on the operation permit pursuant to letter a) of the Mining Act. c) Act No. 201/2012 Coll., on Air Protection.*

e) Geotextiles

The city requires the use of a type of geotextile laid under the top layer of the spoil heap, a backfill of clay and a fertilizable layer that will allow the growth of all types of trees and shrubs and will not restrict growth in any way.

Geotextiles are primarily used here for the separation of individual layers and as protection of the insulating foil and will not limit the growth of the trees themselves.

2. Municipality of Řečany nad Labem dated 14.3.2023

In its statement, the municipality of Řečany nad Labem believes that the entire document of the recycling plan is written one-sidedly in favour of mining and that it omits inappropriate factors or mentions them only marginally – e.g. according to this statement, it is the impact on health, downplaying the impact on the environment (in relation to the Site of Community Importance, plants and animals in the vicinity of mining). Factors such as air emissions, noise, dust, increased traffic, the risk of accidents and, last but not least, the risk of reducing the market prices of real estate are either omitted or given minimal attention.

The municipality further states that despite the fact that the mining area is relatively small, the impact of mining is significant and enduring. According to the municipality, in this case, the economic interests do not override the interests of everyone from the immediate and distant surroundings to live peacefully in a safe environment, and mining, which is referred to in the documentation as "recycling", will thus reduce the quality of life in the surrounding villages.

In its statement, the municipality of Řečany nad Labem also points out that a change or modification of technologies during the process would not bring a change or relief for the better, because it would not be able to fully eliminate the above and the ones described below. At the same time, the municipality points out that there is no similar recycling of manganese, and therefore the proposed processes are not proven in practice, so they need to be approached with a higher level of risk.

In addition, the municipality makes the following comments on individual parts of the documentation:

1. Transport

a) The documentation does not take into account the poor technical condition of the II/322 road, where the increase in traffic due to the construction and subsequent operation will definitely not contribute to the improvement of the condition of the road. At the same time, the new type of transport is expected to increase emissions of particulate matter, especially benzo(a)pyrene.

The intention does not represent a significant increase in traffic on the II/322 road, a substantial part of the large-volume transport will be carried out by rail. The II/322 road is in good technical condition, and continuous modernization is being carried out here. The road does not pass through the urban areas of Chvaletice, Trnávky, Řečan nad Labem and now also Kojice, where a bypass has been put into operation.

The impacts associated with transport emissions are evaluated in the documentation.

b) The submitted documentation was not discussed with the Transport Department of the Pardubice Region or with the Road Administration and Maintenance of the Pardubice Region, when the overpass over the siding of the Chvaletice Power Plant will be closed during 2023 and the reconstruction of this overpass will take place for about two construction seasons. Therefore, it will not be possible to run the supply routes for the construction of the plant according to the draft document. A diversion route for supplies will be through the town of Chvaletice, where there will be negative phenomena from the increase in traffic. This fact is not taken into account in the document. There will clearly be an increase in CO2 production, an increase in dust and an increase in noise in the city.

Given the proposed construction date, the comment is not relevant.

c) The intersection of the exit from the site (from both parts – the mining itself and from the opposite side with buildings, warehouses, car wash, petrol station, etc.) will be heavily loaded. The stated number of trucks 500 per day will slow down the intersection, make it more confusing, increase emissions, reduce safety, and transport dirt, chemicals, and potentially contaminated soil further into the surrounding area. The risk of accidents will increase. Even a much smaller number of cars will have an impact on all this. However, the documentation does not propose modifications to the intersection and has not been discussed with the relevant transport authorities.

Part of the Update of the Road Connection Study (Annex No. 9) is a capacity assessment of intersections, from which it is clear that the intersections will meet the capacity requirements. A very overestimated number of vehicles was used for the assessment (the aforementioned 500 trucks/day was chosen), for which the capacity of the intersection is still sufficient, however, the total number of passing vehicles from the project will be significantly lower (the project generates 42 heavy trucks per day, i.e. 84 trips).

Trucks moving in the mining area will practically not enter the public road at all, which minimizes the risk of road pollution. This applies to mining vehicles (dampers). Other trucks, e.g. bringing material for restoration, will be cleaned in the washing system when they get dirty.

Bringing any chemicals onto public roads is excluded.

d) During the demolition of the existing site, material will be transported from conveyor belts 1,200 meters further for a period of 20 weeks. Emissions will increase, noise will increase, dust particles in the air will increase (there is no calculation of the amount for everything), the lighting time will be extended if the demolition will take place in the winter months (not specified in the document).

The construction phase, including demolition and construction of a temporary landfill, is described in detail in the documentation and evaluated in a dispersion and noise study. Only the construction site itself will be illuminated for the time necessary from the point of view of occupational safety.

A technological bridge with a conveyor belt will be used to move the demolition material across the II/322 road.

e) For the import of chemicals and the removal of manganese products, the calculation of emissions, noise, dust, light, and the risk of accidents is not given separately.

Noise and emissions from traffic on public roads are assessed in the documentation (including noise and dispersion studies). Traffic lighting only applies to vehicle headlights, as standard equipment of any car. It is a common class II capacity road, i.e. a public road intended for the operation of road trucks and passenger vehicles. The capacity of the intersections has been assessed, and an increased risk cannot be assumed in terms of accidents. Any local modification of the road in terms of technical design or traffic signs will be discussed in the next phases of the project permit with the relevant state administration bodies and the Police of the Czech Republic.

f) To transport magnesium carbonate, 45 dump trucks are expected to be used per week. It is not clear what kind of cars. There is no calculation of emissions, noise, dust, light, accident risk.

This transport is included in the transport study under the heading "Intermediate products from the factory" and is therefore also taken into account in the traffic balance, dispersion and noise study. Standard trucks with the possibility of tipping the body and with tarpaulin will be used.

g) For construction and mining alone, the need for 20,000 litres of diesel per week is calculated. It is not clear how the filling station in the area will be replenished, how many tankers will arrive per week, where the diesel will be imported from, what roads they will use to move. There is no calculation of emissions, noise, dust, light, accident risk.

Transporting diesel to the construction site and handling diesel within the construction site is a completely standard activity on any construction site. Of course, diesel refueling is carried out in a secure manner (on a paved area or with the use of drip trays). There is an option to use a certified double-jacketed tank with a dispenser. Due to the total volume of transport to the construction site, the transport of diesel (1 – 2 cars per week) is absolutely negligible.

h) The assumption of mining for 25 years + the preparation and construction time of the sites will burden all roads in the vicinity, on which all cars and equipment associated with mining will move. During that time, increased traffic will affect the quality of communications. It is not stated how any repairs of such damaged roads owned by the region and municipalities will be assessed and dealt with. In the event of a road closure, it is not clear how transport from mining to the plant will be handled. In the place where mining will take place, there is also a planned cycle path Pardubická Labská and the safety of cyclists will be endangered by increased traffic. The municipalities of Řečany nad Labem, Trnávka and Chvaletice are involved in this project. The project should be implemented within 3 years.

The intention is not in conflict with the proposed cycle path, which is what the documentation states.

In general, roads are intended for freight and passenger transport. This service is provided by the state to all hauliers and vehicle operators, and no specific carrier can be excluded.

i) There is a lack of a comprehensive calculation of emissions, noise, dust, accident risk, light pollution from all transport activities associated with construction or mining and its subsequent comparison with the limits.

As mentioned above, all traffic is included in the dispersion and noise study. Road freight transport will not be operated at night, and the risk of accidents will not be increased.

j) It is not specified how the extracted sludge will be transported, how often and where. The harmfulness of this potentially contaminated material is not mentioned. There is no calculation of emissions, noise, dust, light pollution, accident risk and contamination in the event of an accident, whether traffic on roads, railways or an accident on the premises.

The handling of tailings material is described in detail in the documentation. The impacts related to its transport (intra-site transport in the mining area) are evaluated in detail. A dumper accident in a mining area does not pose any risk with an impact on the environment, given that it is an area that is made up of this material, dumpers will only move in the tailings area. A technological bridge with a belt conveyor will be used for transport to the plant. Tailings material will not be transported on public roads at all. Other vehicles leaving the mining area will be cleaned in the washing facility in case of dirty wheels.

k) There is a lack of an assessment of the impact of all traffic at different times of the year, in different weather conditions.

Traffic (intra-premises or public road transport) will be adapted to specific weather conditions, a routine practice for carriers and drivers. There are no increased risks to the environment and public health from transport at different times of the year. In absolutely extreme conditions (hailstorms, torrential downpour, ice, snowdrifts), transport will be temporarily halted in the problematic section as necessary.

l) It is directly stated that as a result of mining, all possible conditions on the roads are expected to deteriorate. As a solution, it states "that the investor must keep his communications in order". There is a lack of concrete steps on how, who, when, under what conditions communications will be maintained. This issue has not been discussed with the owners concerned and the Transport Inspectorate.

The formulation mentioned in the first sentence does not appear in the text at all. The condition relating to the maintenance of roads applies to intra-site roads, especially in the area of mining. This is an important measure to minimize the impact on the atmosphere. Details of the anti-dust measures will be further formulated in the operating rules of the air pollution source, which will be approved by the air protection authority in the next stage of the project preparation.

m) In the case of the construction of a noise barrier, there is no measurement of how big and long the wall should be. There is a lack of studies on whether, on the contrary, the noise created by mining will be reflected into the unprotected surroundings and cause a problem from the accumulated sound on the other side.

The requirements for the acoustic screen are clearly formulated in the acoustic study.

n) The tables show that some works (e.g. trucking, drilling, etc.) will take place for 12 hours/day, which is unacceptable, due to noise disturbance, dust, fume spread, light pollution, traffic.

The operating hours of all activities are clearly stated in the documentation (especially the three-shift operation of the processing plant and the two-shift *operation of mining). All operational parameters are then matched by the impact assessment, i.e. also the calculations in the noise and dispersion study.*

2. Demolition of buildings and construction of premises

   a. It has not been verified whether the buildings that will be demolished are not contaminated from previous activities.

      The field investigation as part of the study of the removal of the building (Šarman, 2022) does not imply a risk of contamination of buildings (in the sense of, for example, oil substances).

      Pure construction debris will be used to produce recycled material. For further use in remediation and reclamation, it must meet the demanding requirements of Decree No. 273/2021 Coll. for use for backfilling. This will guarantee quality control. Any non-compliant construction and demolition waste will then be handled in accordance with the Waste Act, and this waste will be handed over to the relevant facility for disposal as waste.

   b. The document did not examine the content of PUAs in communications to be demolished. It is not entirely clear how this material will be handled. If demolition debris is to be used on an embankment, it is not specified how it will be treated to ensure that PUA does not spread to the surrounding area.

      The material from the demolition of roads will not be used at all for remediation and reclamation in the mining area. It will be treated as waste. The study of the removal of the building assumes the generation of 292 tons of waste catalogue number 170301, which will be handed over to the relevant facilities that are allowed to handle this waste.

   c. In addition to the above, the carbon footprint of these activities is not calculated.

      It is not clear why it should be calculated. It is negligible in the context of the project. The demolition of existing asphalt roads and buildings, some of which are in a state of disrepair, would certainly occur in the future even without the project. The use of material in the vicinity, i.e. without transport to a more distant location, can be assessed positively in terms of climate impact.

   d. It is not specified how the contaminated soil from the construction will be used.

      The documentation describes the management of waste from demolition and construction, which also includes earthworks. The use of soil is preferred, primarily for remediation and reclamation in the mining area. If any soil is unusable for backfilling, i.e. does not meet the requirements of Decree No. 273/2021 Coll., it will be handed over to the relevant waste disposal facility.

      With regard to all of the above-mentioned points, it can be stated that on the basis of the requirement of the Ministry of the Environment, a condition has been added to Chapter D.IV that the requirements for waste management according to the "Methodological Instructions of the Waste Department of the Ministry of the Environment for the Management of the Generation and Destruction of Construction and Demolition Waste" from 2018 are incorporated into the documentation for demolition and construction.

However, based on the exploration work carried out so far, contamination is not expected, as evidenced by the surveys cited in the documentation (Schreiber, 2020; Šarman, 2022).

e. Single-walled tanks are expected to be used for sulphuric acid storage tanks, which we consider to be a problem from the point of view of safety and environmental protection, and we ask for a change to double-walled tanks.

f. For ammonium bisulphite tanks, it is assumed that single-walled tanks will be used, which we consider to be a problem from the point of view of safety and environmental protection, and we ask for a change to double-walled tanks.

g. *Response to points e. and f. The single-walled sulphuric acid reservoir and the ammonium bisulphite reservoir will be located separately in an emergency sump with sufficient volume to catch any leakage, which is a sufficient measure to prevent undesirable leakage of harmful substances into surface or groundwater or sewerage systems according to the Water Act. At the same time, the operator will implement organizational and control measures to prevent a potential leak – these measures will be specified in the Plan of Measures in the Event of an Accident (Emergency Plan), which will be approved by the relevant water management authority.*

h. For the washing installations, which should be located on the premises, it is not specified how the water that may be contaminated will be cleaned and where it will be discharged. There is no preventive and emergency plan in case of a leak of this water.

   The washing unit for trucks will be located in the area of the pulping station in DP, it will be used only for washing the wheels of vehicles before leaving the quarry area and washing the wheels of dampers in case of heavy soiling. It will be equipped with equipment to capture any oil substances. The contamination of the washing water will be caused mainly by the sludge material, and therefore the washing water can be used further in the technological process as water for the pulping of the raw material.

   Emergency plans for all facilities will be drawn up in the next stages of the permitting process based on the relevant legislative requirements.

3. Landfill in the west of overburden materials from the plant area

   a. Here we disagree with the proposal for a landfill as presented. It is quite clear that the top layer of the overburden will dry out quickly during the summer and will therefore be very susceptible to wind erosion and erosion into the surroundings, and thus the chemical parameters of the environment will change, which can be considered a negative phenomenon. At the same time, we would like to point out that about 170 m from the mining site there is a part of SCI Louky u Přelouče, where this site will be negatively affected by this. There is not enough assessment of how this depot will affect this site.

   b. It is not clear from the submitted document how it will be ensured that the water that passes through the landfill does not end up in the Elbe.

   c. As the landfill partially extends into the flood plain, we require the proposal of measures against flooding of the landfill and the removal of contaminated material. The described solution is not sufficient from a safety or environmental point of view.

d. From the intermediate deposit, the material should be gradually used for the rehabilitation of the repository. It is not described how it is ensured that the material used will not be contaminated with anything or will not contain debris from the construction. The top layer of the deposited material will dry out quickly during the summer and will therefore be very susceptible to wind erosion and drift into the environment.

Regarding part 3 of the observations, it should be noted, first of all, that no contaminated or hazardous material will be placed in the temporary deposit. It will be clean excavated soil or pure recycled material. The clean construction debris will be crushed, sorted into fractions, and the resulting recycled material will later be used as embankment and backfill material for the construction of a mining waste repository. Uncontaminated excavated soil will also be used for the same purpose. See sections B.I.2 and B.I.6 for details.

Measures to minimize dust associated with the construction and operation of the temporary landfill are listed in Part D.IV. It is primarily about grassing the landfill and optimizing the removal of material from the landfill so that the outer side of the landfill (windward and upward) remains with the vegetation cover.

The risks associated with flood conditions are evaluated as insignificant, and a flood plan is also expected to be prepared.

An opinion on the impact on SCI Louky u Přelouče was issued pursuant to Section 45i of Act No. 114/1992 Coll. by the Regional Authority of the Pardubice Region, Department of the Environment and Agriculture on 24.3.2020, Ref. No. 21444/20220/OŽPZ/Pe, concluding that the project cannot have an impact on the objects of protection of the Site of Community Importance or Bird Areas individually or with other plans.

4. Tailings

   a. The documentation does not sufficiently take into account the need for remediation of the affected subsoil under the tailings, when manganese and other substances have clearly penetrated into the subsoil during the existence of the tailings, which can be considered one of the fundamental problems of the entire document.

   By recycling the tailings, the source of possible contamination in the future will be eliminated. Contamination is particularly risky due to the constant leaching of contaminants into groundwater and, in the environment of a permeable Quaternary aquifer, into the Elbe River. Removing this permeable gravel-sand collector and replacing it with another material does not make sense, from this point of view it is essential to stop the washing out of contaminants and to propose the separation of newly built landfills by an insulating layer.

   Due to the removal of the source of contamination, the project will have a clearly positive effect on the cleanliness of groundwater and the rock environment.

   b. The documentation does not sufficiently address the pumping and treatment of groundwater from the mining area.

   No groundwater will be pumped out of the mining area. The original assumption of using groundwater from 2 boreholes in the DP stated in the notification of the project is no longer part of the plan.

5. Vegetation removal

c. The vegetation cover of the site was not assessed for the content of hazardous substances. Without laboratory analyses that would unequivocally prove harmlessness, it is not possible to assess this material as safe. Without this verification, it is not possible to consider the storage of the material in the reclamation area as ecological and beneficial for the environment.

It is not clear which hazardous substances the vegetation cover could contain so that it cannot be used as a source of organic matter.

d. The document contains confusing information about the complete removal of vegetation and at the same time about removal of the animals endangered by construction and mining and leaving part of the vegetation for other endangered animals. It lacks specific information on the location, management, and oversight of mining strips, leaving questions about their implementation and control unanswered.

The entire process of continuous overburdening, mining and gradual remediation and reclamation "behind the back" of mining is described in detail in the documentation, further information is provided in the draft Summary Plan of Remediation and Reclamation. It is not clear in what sense this information is misleading. In the next phases of the preparation of the plan, the reclamation will be specified within the framework of the mining permit, where the Plan for Opening, Preparation and Mining also includes the Plan of Remediation and Reclamation. The control of the implementation of the remediation and reclamation plan is primarily the responsibility of the District Mining Authority, which releases financial reserves for remediation and reclamation, which are gradually deposited during mining into a special escrow account. Further control may be carried out by the relevant state administration bodies responsible for nature and landscape protection.

6. Sewage Treatment Plant (Building h)

a. The WWTP is designed for 350 PE, but according to the document, there will be over 400 workers during the day, so it is obvious that the capacity of the WWTP may not be enough.

When designing the capacity of the WWTP, standard recalculations of the number of employees per population equivalent (PE) for the production plant were used. The capacity of 350 PE is absolutely sufficient in this case (production, not housing).

b. The document does not clarify how to proceed in the event of a WWTP failure when cleaning will not take place. It can be assumed that water without treatment will be discharged directly into the watercourse, which is a clear threat to the environment.

c. The document does not take into account the possibility of torrential rains filling the wastewater treatment plant.

With regard to points b. and c., it should be stated that the construction and operation of wastewater treatment plants (including emergency conditions) is a completely standard activity in most municipalities and industrial plants, and from this point of view no extraordinary risks are seen. The details of the operation will be dealt with in the next phases of the project permitting, when the relevant operational and emergency plans will be approved.

7. The documentation does not include studies of light smog, which will be from the plant and will negatively affect the environment.

The issue of light pollution has been added to the documentation, namely to Chapter B.III.4. and D.3. In Chapter D.IV there is a clear requirement to respect the new Czech technical standard ČSN 36 0459. At this stage of project preparation, this is considered sufficient.

8. The documentation does not specify the total carbon footprint of production, transport, environmentally friendly waste disposal.

The impacts associated with climate change are evaluated in the documentation, an exact calculation of the so-called carbon footprint is not necessary for this assessment. The calculation of CO2 emissions is made in the documentation for mining, processing of raw materials and disposal of mining waste (i.e. remediation and reclamation), as well as for all types of intra-site transport, which is a fundamental part of the emissions associated with the project. Emissions associated with off-site transport (raw materials and products) cannot be carried out without knowledge of the specific points of sale of products. Given that it will be the only manganese source processing plant in Europeand a potential point of consumption, this is evaluated positively in terms of climate impact. This is an opportunity for both the Czech Republic and the broader European region to proceed in accordance with the so-called Sustainable Development Strategy. The Green Deal, which seeks to accelerate the decarbonisation of the whole of Europe and fulfil the principles of the circular economy. The implementation of the project "Recycling of the Chvaletice-Trnávka Tailings" will guarantee a certain degree of self-sufficiency in the supply of high-purity manganese products and thus reduce the carbon footprint during their production and transport from China, from where more than 90% of manganese suitable for electric car batteries is currently imported.

9. The projected annual emissions of sulphuric acid, hydrogen sulphide and manganese are completely unacceptable. It will significantly affect the health of the population in the vicinity and significantly damage the environment. The impacts of such a large amount on the environment are not precisely specified. The document downplays the negative impact of such a large amount on health and the environment. We demand a redesign of the overall technology so that annual emissions are reduced many times over the assumption.

The technological solution of the project is designed in such a way that the mentioned emissions are practically non-existent. However, the assessment is carried out with uncertainty in mind, so these emissions are evaluated. In all cases, these are only theoretical emissions in the order of tens of kg per year, which in the end practically does not affect the air pollution situation in the vicinity of the plant at all, where the resulting emissions at the nearest residential area are calculated at the level of hundredths to thousandths of μg/m3. It is clear from the results of the public health impact assessment that such concentrations are negligible.

Minimization of manganese emissions is directly related to the minimization of dust emissions as such, which is duly addressed in the documentation.

The stated amount of hydrogen sulphide emissions is the maximum theoretical value – so far it has not been proven that hydrogen sulphide will actually be *produced in the process. The final demonstration or refutation of hydrogen sulphide air emission production is expected at the end of the test operation of the verification unit, i.e. in I.Q.2024.*

As part of the test operation permit issued by the Municipal Authority of Chvaletice on 18.4.2023, ref. no. CHVA-2747/23/SÚ/LHo, the condition of carrying out measurements of pollutants in the working environment, including hydrogen sulphide, is set, which will confirm/refute the presence of hydrogen sulphide formation – in the event of confirmation of hydrogen sulphide formation, appropriate measures will be determined that will be taken into account in the next stages of the permitting process. Currently, hydrogen sulphide has not yet been detected during the test operation of the demonstration plant. It can be stated that if the requirements for occupational health paralysis are taken into account, any impact on public health in the surrounding municipalities can be ruled out.

Similarly, in the case of sulphuric acid emissions, these are again trace amounts that can theoretically be emitted after the waste gas scrubbing. This is an amount at the lower threshold of the expected scrubbing efficiency.

In the case of hydrogen sulphide, a public health impact assessment was added to the revised documentation (Zemancová, 2023, Annex No. 3). In this assessment, it is stated that the specific air pollutants produced by the project, which will be H2SO4, ammonia, hydrogen sulphide and manganese, were evaluated using screening risk characterization by comparing reference exposure limits, reference concentrations, limit exposure doses and olfactory thresholds set by world scientific institutions with the WHO preferential choice. The results of this assessment do not indicate any possibility of a negative impact on public health, the contributions of the intention of these pollutants are completely insignificant and far below the level of the reference values.

10. Mining waste as an input raw material for remediation

    a. With regard to the fact that mining waste currently significantly exceeds the limits in some values, we ask for the modification of the proposed technology so that waste that is significantly below the limits also with regard to the storage site and the adjacent river leaves the production. At the same time, we require proof of the pH of the surrounding soils in the locality and the determination of the average pH value to which the waste material will be treated so that it can be used in the reclamation of plants typical for the Elbe region.

The proposed method of securing the mining waste disposal site also corresponds to the expected composition of the waste. The aforementioned exceeded limits only apply to disposal at an unsecured location, such as backfilling or disposal in a landfill of inert waste.

Mining waste will be isolated from the surroundings at the repository, so comparing the properties (e.g. pH) in the surrounding soils or soils does not make sense. Mining waste will not be used for reclamation in the outer layer above the insulation.

The specification of the properties of the mining waste is expected during the operation of the verification unit. The trial operation of the verification unit was permitted on 25.5.2023 by the Building Authority in Chvaletice for the purpose of practical testing of the proposed technology for the production of high-purity *electrolytic manganese metal and manganese sulphate monohydrate crystal. Mining waste (waste from non-magnetic separation and leaching process) is disposed of by a waste company in the conditions of the test plant under the Waste Act. The initial analyses of this waste confirm the previously stated values or even lower values (As, Ba, Cr, Hg, Ni, Pb, Sb). For other parameters the results are not yet representative or final due to the gradual commissioning of the individual modules of the test unit and the refinement of some production stages (cleaning, filtration, etc.). Further sampling and analysis of this waste are scheduled in the fourth quarter of 2023, aligning with the commissioning of the individual modules of the verification unit in accordance with the trial operation permit. The final verification of the technology and the acquisition of representative waste samples is expected at the end of the trial operation, i.e. in in the first quarter of 2024.*

11. Siding

a. It is not described how the waste from the construction of the railway siding will be disposed of in an environmentally friendly manner. The document also does not mention laboratory analyses from the vicinity of the former siding from the point of view of the content of hazardous substances for the environment.

The subject of the study for the removal of the structure (Šarman, 2022) is also the railway siding. Waste from it will be treated in the same way as waste from demolition. Legal waste management is the duty of the contractor and is not perceived as extremely risky in terms of environmental impact assessment and public health. For details, see the settlement of comments on item 2.

b. The document does not specify the length of the train and whether the capacity of the trackage of the railway station in Řečany nad Labem will be sufficient with regard to the needs of the Chvaletice Power Plant.

More detailed data on the lengths of individual trains are given in the version of the road connection study for the screening procedure (SUDOP, 11/2019, published on IS EIA). The length of the train is expected to be in the range of 305 - 373 m, which is reflected in the length of the railway tracks at the railway station. Řečany nad Labem is absolutely satisfactory. Due to the necessity to handle an average of 1 train per day (326 trains per year), the capacity of the station is deemed satisfactory.

c. The document does not address possible leaks from tankers at the outage at the railway station in Řečany nad Labem, nor does it address the parking places where it will be possible to catch the spills and dispose of them in an environmentally friendly manner.

d. The documentation does not deal with the case when the tank in question is declared technically unfit for towing and is repaired on a side track in Řečany nad Labem, as is already commonly the case with coal wagons.

Response to points c. and d. All cargo will be transported according to the relevant safety instructions and regulations, this is ensured by the carriers. It is not clear why the emergency situation at the railway station should be dealt with separately. Řečany nad Labem and not at any other place on the route.

An emergency plan and other regulations will be prepared for the operation of the siding according to standard and legislative requirements. The transport of raw *materials and products by rail are not seen as an extraordinary risk in terms of environmental and public health effects.*

e. The construction of the siding will take 48 weeks. There is no description of the process, the materials used, how the material will be imported and when. There is also a lack of a description of how excessive noise from the construction site, light pollution in the winter months, dust particles, emissions, and increased traffic should be addressed. Specific values and their comparison with valid limits are missing.

The construction of the entire project, including the siding, is described at a level sufficient for the EIA process. The impacts associated with the construction are evaluated, especially with regard to noise and air pollution. Regarding the construction of the siding, it is characterized more as a reconstruction or restoration in its original location, with no substantial adverse effects anticipated on the environment or public health.

12 Water

a. The document repeatedly states one of the main arguments for mining that the groundwater in the vicinity is contaminated with the manganese present. Other studies refute this. There is a lack of studies to prove or refute inadmissible and harmful contamination of groundwater. There is a lack of comparison with the description of the individual methodologies that were used to conduct all the studies.

One of the consequences of the implementation of the project (not the main argument for implementation) is the removal of the existing source of contamination, especially of groundwater. From the point of view of the impact on the quality of groundwater and surface water, the impact is evaluated as favourable, details are given in Annex No. 4, which summarizes other professional work carried out in previous years (e.g. Francírek, 2019; Kuchovský, Říčka, 2019; Lisovoi, 2021; Lisovoi, 2022)

b. Water from outcrops is to be used for technological purposes. It is not specified how much such water will be used. There is no statement on exactly how it should be used if, as part of the document says, the water is contaminated with manganese. It is not specified how it should be cleaned and where it will be discharged and what parameters this water will meet.

The documentation in Chapters B.I.6, B.II.2 and B.III.2 provides a detailed description of water management, including the calculation of the amount of mine water. Water from the mining area will be used to pulp the raw material and transport it to the production plant. The so-called water contamination is caused by the fact that it will be pumped from the tailings area, i.e. from the reservoir itself, so its use for mixing with the raw material and its transport is completely logical. Details on water purification are given in Chapter B.III.2.

c. There is no description of the prevention of possible accidents and contamination due to shutdowns and/or excessive rainfall.

The issue of risks is contained in Chapter D.II.

d. There is no biological monitoring plan due to groundwater contamination caused by construction and mining.

It is not clear what kind of contamination is assumed. The issue of risks is contained in Chapter D.II., the impact on water quality is then evaluated in Chapter D.I.4.

Massive contamination of groundwater, which would have effects on biota, is excluded, on the contrary, the implementation of the plan will stop the current spread of groundwater contamination.

e. The use of rainwater is vaguely described. No conclusion can be drawn from this information.

See response to point 12.b.

f. The document does not fully address the treatment of mine water from the original mining area, which can be considered the main factor of pollution.

Mine water will be pumped from the mining area and used in the process of transport and treatment of the raw material, see response to point 12.b. If groundwater is meant, see the response to points 4 and 12.a.

g. During water analyses, it is unilaterally stated that manganese pollution comes mainly from these deposits, but nowhere is it stated that the increased manganese values in the given locality are partly and naturally due to the rock composition.

From the point of view of manganese pollution in the area of landfills and in the vicinity, the current tailings are clearly the most important source, which results from the Hydrogeological assessment and its supporting materials (GEOMIN, 2019 – 2022; Kuchovský, Říčka, 2019).

13. Noise

a. Individual items of processes used in construction or mining are below the hygienic level. However, the processes will take place at the same time. There is no description of which processes will be concurrent and there is no evaluation study to determine the level of noise from all these concurrent processes. It applies to construction, mining, automobile and rail transport.

A comprehensive acoustic study dealing with noise from construction activities, noise from rail and road transport and noise from traffic is presented in Annex No. 1 to the documentation. The acoustic study was fundamentally redesigned according to the requirements of the KHS of the Pardubice Region for documentation, it is discussed in the mode of preliminary discussion according to Section 15 of Act No. 100/2001 Coll. Due to the existing acoustic load of the area by other noise sources, extreme technical measures are taken to minimize noise.

The acoustic study evaluates noise in accordance with valid methodological procedures and takes over the hygienic limits from the valid Government Regulation No. 272/2011 Coll., on Health Protection against the Adverse Effects of Noise and Vibrations, as amended.

b. The document does not specify how it will be checked, how often noise will be measured and whether its limits are exceeded. Who will control this and how. Only the Hornická čtvrť is being addressed.

Chapter D.IV contains a requirement for the preparation of an Acoustic Monitoring Plan, including general requirements for noise measurement (the municipality of Řečany nad Labem is also mentioned). Its details will be discussed with the public health protection authority in follow-up proceedings. The Public Health Protection Authority (KHS of the Pardubice Region) is a supervisory authority. Acoustic measurements will be carried out after the start of the project operation and further *as necessary. This includes situations when the noise environment undergoes changes due to alterations in the operation of the surrounding projects and especially when the mining area is brought closer to the development of individual settlements. Noise measurements will be carried out in all potentially affected surrounding municipalities (Chvaletice, Trnávka, Řečany nad Labem, Zdechovice, Selmice, Labské Chrčice). Measurements may only be carried out by entities with accreditation or authorization within the meaning of Section 32a of Act No. 258/2000 Coll., on the Protection of Public Health, as amended.*

c. Noise below the hygienic limit from individual processes is not considered problematic. However, for more than 25 years, there will be increased noise and it will affect the mental and physical health of humans and animals. Clearly, noise will affect the quality of life during construction and mining. There is a lack of measures on how this will be addressed.

Due to the necessity to respect the existing noise pollution of the area, very strict requirements are set for the noise level of the project itself. Therefore, the project will not change the current noise burden of the area, and at the same time the noise from the operation of the project itself will not be narrowly, but very significantly below the hygienic limit (see chapter 8.6.3 of the acoustic study).

d. The document defines the hours of work outside the night-time rest, i.e. between 6:00 a.m. and 10:00 p.m. Elsewhere it is stated that the work will be carried out by 21:00. This is unacceptable. People want and have the right to rest after normal working hours, they do not want to be disturbed by noise, emissions, traffic, dust, fumes. It is not described how it will be solved.

As part of the acoustic study, hygienic limits for daytime (6:00 – 22:00) and night time (22:00 – 6:00) are respected. Mining will not be carried out at night at all, but the processing of raw material will, but with respect to the hygienic limit and the existing noise pollution of the area. Noise from construction activities has a hygienic limit for the daily period of 7:00 – 21:00, for which an assessment has been carried out. It is clear from the results that the hygiene limit will be safely adhered to.

Chapter D.IV also specifies a measure to ensure that noisy construction work is not carried out after 7 p.m., even though the highest hygiene limit is in effect until 9 p.m.

14. Purification of manganese sulfate solution (B16)

The process is not described and under what conditions the waste material from B16 will be stored, how it will be disposed of and what the total carbon footprint will be.

Data on the process B.I.6 are given in Chapter B.I.6, generated waste and the method of waste management in Chapter B.III.3.

15. The document does not include an assessment of the change in the microclimate in the given environment of the material processing plant, when a large amount of water vapour is released.

a. Microclimate change is rated as "having no significant impact". There is a lack of methodology for classifying individual categories of influences. It is therefore not clear from the document how that assessment was made.

The evaporation of water in the area of the plant is also taken into account in the assessment of the impact on the microclimate in Chapter D.I.2, it is assumed that the impact will be limited only to the area of the plant, i.e. without any impact on the surroundings. For information on the methodology of impact assessment in general, see below.

b. It is not stated that this is a period of 25 years of mining + the period of construction and preparatory work.

The documentation works with these time horizons in many places, so it is clear that they also concern the impact on the microclimate.

16. Impact on the environment and health

a. There is a lack of a complete study on the basis of which the impact on habitats is evaluated as "insignificant". The impacts of noise, emissions, traffic, light pollution, land occupation, etc. are not addressed.

The assessment of the impact on biotopes is justified in Chapter D.I.7, it is based on a comprehensive biological survey and also considers the method of remediation and reclamation.

b. There is a lack of a complete study on the basis of which the impact on SCI (Natura protected ares) was evaluated as "insignificant". The impacts of noise, emissions, traffic, light pollution, land occupation, etc. are not addressed.

In accordance with the legal requirements, the impact on the SCI has already been excluded by the opinion of the Regional Authority of the Pardubice Region, Department of the Environment and Agriculture of 24 March 2020 under ref. no. 21444/2020/OŽPZ/Pe, which states that the submitted project cannot have a significant impact on the objects of protection or the integrity of any Site of Community Importance or any Bird Area individually or in conjunction with other plans or concepts.

c. In the case of the liquidation or damage of rare and specially protected plants, there is no study, conclusion, assessment of the impact of mining. The impact of noise, construction site/mining activity, light pollution, traffic, potential contamination with chemicals or contaminated water is not addressed. There is also a lack of a proposal for a solution or corrective action.

d. For the liquidation or damage of rare animals, there is no study, conclusion, assessment of the effects of mining. The impact of noise, construction site/mining activity, light pollution, traffic, potential contamination with chemicals or contaminated water is not addressed. The corrective action is insufficiently described. It is not explained what the basis for the assumption is that the animals will temporarily move to another place. There is a lack of a control plan and a proposal for a solution if this is not the case.

e. There is no proposal for action in the case of the rose chafer.

f. In the case of the edible frog and the agile frog and the common and green toads, the beneficial impact of mining is taken into account after the formation of a body of water. It is not stated what it is based on. There is a lack of studies. It is not stated how long it will take for a specific replacement body of water to be created (on the contrary, it is specifically mentioned during mining that a body of water must not be created during mining, so that toads do not immediately settle in it), where the animals should live until then. There is a lack of information on how the capture of individuals found on a construction site or during mining will be handled, where individuals should be taken and who will control.

g. In the case of lizards and slowworms, there is a lack of information on how the capture of individuals found on a construction site or during mining will be handled, where the individuals should be taken and who will control them and how.

h. In the case of the grass snake, it is not stated how the capture of individuals found on a construction site or during mining will be handled, where the individuals should be taken and who will be controlled. Grass snakes were found only in the first and second mining lanes. There is a lack of studies that would discuss the environment in which they occur, what is the probability that grass snakes would take root in other environments. There is also a lack of control as to who will control and how.

i. In partridges and quails, there is a lack of information in which period they nest, bring out their young, how long the parents take care of them. The document contains the confusing information that they will keep their "home" shrubs at the edge of the mining area, although there is no such mention in the chapter on the removal of vegetation. There is also a lack of control as to who will control and how.

j. In the case of shrike and saxicola, it is not clear from the documentation when they nest, raise their young, how long the parents take care of them. It is not specifically described where the unmowed area will be left for them (the chapter on the removal of vegetation does not mention anything of the sort). Furthermore, it is not clear when and where exactly shrubs will be planted for them, in which they could nest after the loss of their natural habitat, how tall the shrubs should be so that they can nest in them, and how long such shrubs grow after planting. It is not clear from the document when the bushes should be planted. There is also a lack of control as to who will control and how.

k. In the case of the nightingale and oriole, it is stated that it will be felled outside the nesting period. It is not stated when this period occurs. Who will control and how.

l. In the case of a squirrel, it is stated that it will be felled outside the nesting period. It is not stated when this period occurs. Who will control and how.

m. In the case of the newt, it is stated that at least one year before the start of the work, a survey of spawning grounds and/or the creation of new ones must be carried out. How the survey will be conducted. Who will control and how. There is no information on where and how the creation of new spawning grounds will take place. Who will control and how. Furthermore, it is not described how the individuals found on the construction site/during mining will be captured and transferred. Who will control and how.

n. In conclusion, the negative impact of construction/mining on plants and animals is admitted, but it is evaluated that the effect is reversible and ultimately "insignificant and potentially even favorable". On what basis does such a conclusion come? A complete study of individual plants and animals is lacking. It has not been assessed how particularly sensitive animals react to changes. It is not stated how the return of individual animals to their original place will be controlled after the completion of construction and mining itself, i.e. for more than 25 years.

o. It is not explained how construction/mining activities will be carried out if the work is to be stopped for the period of reproduction of the animals present and the period of adverse weather conditions. It is not stated when each of the mentioned animals' nests, but it is mentioned that it is roughly the period from April to October. Weather conditions in this region tend to be in autumn and winter. Is it possible to assume that construction and mining will be stopped for most of the year? It is not stated who will control and how.

The assessment of the impact on rare and specially protected species of plants and animals is based on a detailed botanical and zoological survey (Annex 5 to the documentation).

When assessing the impacts on these species and specific individuals, both the circumstances of the find (location, number of individuals, etc.) and the biotope, or food and shelter requirements of the individual species, as well as the occurrence in the surroundings, etc., were taken into account, and all described in detail in the cited appendix.

Measures to minimise, eliminate or compensate for adverse impacts on biodiversity are clearly summarized in Chapter D.IV for the preparation, construction, operation and completion phases. The requirement for the elaboration and subsequent application of the Biological Monitoring Plan is essential. At the same time, with regard to specific measures for individual species of plants and animals, it is stated that these measures should be perceived as recommended. The final form of the measure is determined by the nature conservation authority as part of the granting of exceptions from Section 50 of Act No. 114/1992 Coll., on Nature and Landscape Protection. Too specific measures resulting from the conditions of a binding opinion on the environmental impact assessment and the conditions of the decision to grant exemptions could lead to their duplication or incompatibility, and thus difficult to implement (they must be taken over in decisions issued in subsequent proceedings). In this particular case, the decision of the nature protection authority pursuant to Section 50 of Act No. 114/1992 Coll. is perceived as a more effective tool for setting binding measures.

p. The document states that about 20-30% of plants and animals, some of which are on the red list of endangered species, are expected to die. This contradicts the claim elsewhere that the impact of both construction and mining is "reversible and ultimately insignificant and potentially benign."

An irrelevant comment. The value of 20-30% does not at all apply to the death of any individuals or species caused by intention. This is a quote from the National Action Plan for Adaptation to Climate Change.

q. The document states that the possible smell from individual mining processes will be below the perceptible limit for humans, it has not been addressed how this will affect particularly sensitive individuals (the elderly generation, children, pregnant women, people suffering from diseases/disorders). Furthermore, it does not address how the smell will affect animals living in the immediate and more distant surroundings and what effect the smell will have on their lives. It applies to both domestic and utility animals. In the case of utility products, the smell could affect meat, milk, eggs. There is a lack of studies.

The odour sensations and potential health effects of ammonia and hydrogen sulphide are discussed in detail in a study of the impact on public health. In the case of hydrogen sulphide, this study has been supplemented. It is obvious that even *short-term calculated concentrations are at least an order of magnitude lower than the lowest reported olfactory threshold. Average annual concentrations are then calculated to be two orders of magnitude lower.*

Given that, in the case of ammonia, the main producer of ammonia is agricultural livestock production, the question of the impact on livestock is completely irrelevant. Average annual ammonia concentrations in residential areas will be completely incommensurable compared to concentrations in farms.

On hydrogen sulphide, refer to the response in point 9.

r. The document "unequivocally positively" assesses the impact of construction and mining on the climate. It is not described what it is based on. There is a lack of studies.

The argument is clear from Chapter D.I.2.

s. The document shows that the impact of mining will prolong the duration of respiratory diseases by an average of 0.3 days/year in children. It is rated as insignificant. In practice, any prolongation of respiratory diseases is inadmissible.

The information is taken out of the context of the assessment, which further considers the current air pollution load of the site as well as the valid air pollution limits. In addition, the assessment concerns only closer municipalities (Trnávka, Chvaletice, Selmice, not Řečany nad Labem) and it is stated that the evaluation is valid under the assumption that all these children would be exposed to the maximum quantified contributions of average annual concentrations of PM10 (i.e. as the most exposed edge of the built-up area in Trnávka at the same time as the closest approach to mining mechanization). The real exposure of the majority of the population will be significantly lower for most of the time, which is also evident from the course of PM10 concentration isolines in the dispersion study. The evaluation is therefore carried out with a large margin on the safe side.

t. The document does not assess any other potential disease affected by mining.

There will be no diseases caused by mining.

17. Other comments from the municipality of Řečany nad Labem

a. Throughout the document, the expressions "significant quantity", "small amount", "negligible", etc., are used, while nowhere is there a specific statement, comparison of the issue, or the scale according to which it was measured or derived, on what basis it was based. The conveyed information lacks clarity and may be misleading in its current expression.

In most cases, the evaluation is based on model-determined data in accordance with valid impact prediction methodologies, and appropriate models have been created to obtain these data. The final evaluation in Chapter D.I. is carried out, among other things, in the verbal scale, which is evident from the introduction of this chapter. It is based on model solutions and specific data.

This is a standard procedure for impact assessment in the EIA process and the processor of the documentation is convinced that the assessment was carried out correctly. According to the law, the author of the assessment (Expert opinion) is also competent to assess the completeness and correctness of the documentation.

b. The term "above-standard" associated with mining and technological equipment in the Czech Republic is misleading. There is no statement of what it means, what it is compared to.

   This term is used only once in the entire documentation in Chapter D.I.2. to justify the correctness of the assessment of the intent with a duration of 25 years. This paragraph explains why the approach to the design of the technical solution of the intent is considered to be above standard.

c. A comparative graph of the amount of emissions emitted and the calculation that mining will have a 64% smaller impact on global climate change than in China is misleading. China is one of the biggest polluters in the world. Furthermore, it is not stated how it was assessed (e.g. area, population, whole country, etc.). The data in the graph are not comparable, so it is not possible to conclude that the impact on climate is "insignificant".

d. It is stated that the carbon footprint of manganese mining is significantly lower than that of other battery metals. It is not stated what this information is based on, how it was compared.

   Response to points c. and d. The above comparison with other battery metals and with China is not essential to assess the insignificance of the climate impact. Rather, the argument is based on other facts (see above). However, this does not in any way undermine the conclusions of the cited Life Cycle Assessment Study.

e. Mining envisages the use of 30% of the electricity obtained "neutrally". It is not stated how it will be differentiated or how it will be contractually obtained.

   It is the subject of a business relationship between the energy supplier and the notifier. Emission-free electricity can be contractually ensured. These are the supplies of electricity from the sun, wind or water, and these supplies are accompanied by a certificate that guarantees that the customer reduces carbon dioxide (CO2) emissions accordingly. Green certificates prove that electricity is produced from renewable sources.

   However, despite the above-mentioned fact, CO2 production was calculated for electricity produced from sources according to the energy mix of the Czech Republic, so the evaluation is carried out with a margin on the safe side.

f. It is said that in the Czech Republic it is possible to plan mining for 20 years, yet mining is planned for 25 years at the beginning.

   The justification for the time scope of the project is given in Chapter B.I.2. From the point of view of environmental protection, its individual components and the protection of public health, the proposed project is in accordance with the objectives of the Methodological Interpretation of Selected Points of Annex No. 1 to Act No. 100/2001 Coll., on Environmental Impact Assessment and Related Provisions (Ministry of the Environment of 1 October 2018, Ref. No. MZP/2018/710/3250), the purpose of which is to emphasize increased protection of the environment and public health.

g. The impact on tangible assets is assessed as insignificant. One part of the document says that no study was conducted. Therefore, there is a lack of data that would assess the impact of long-term mining and the associated increased emissions, changes in microclimate, noise, dust, increased traffic, environmental impact on real estate prices, due to the negative perception of the location, and the immediate proximity of mining.

No direct effect on tangible assets has been identified (e.g. in terms of vibrations damaging buildings).

The economic indirect effect (potential change in the price of real estate) is not subject to the EIA assessment. However, the processor of the documentation does not find serious reasons for the decline in real estate prices, given the proposed measures to minimize potential negative effects. On the other hand, it cannot be ruled out that the removal of contamination with the simultaneous existence of a modern plant as a long-term employment opportunity may increase the demand for nearby real estate and thus cause an increase in real estate prices.

For details on the assessment of social and economic impacts, see Annex 10.

h. It is not clear from the document to what extent the scrubbers will be freed from all harmful substances during cleaning. There is a lack of studies.

   In the dispersion study, the emissions are calculated, including a description of the equipment for minimizing emissions and indicating their efficiency.

i. The document does not mention how emergencies such as storms, floods etc., will be handled. There is no crisis plan for these events.

   The documentation contains Chapter D.II., which deals with non-standard states. In the next phases of preparation, a flood plan and an emergency plan will be prepared and approved.

j. The document does not mention how changes (e.g. temperature fluctuations, storms, droughts, excessive rains etc.) associated with a possible change in the microclimate caused by mining will be addressed.

   On extreme weather events, see the previous point and points above. Changes in the microclimate on a mined area of several hectares can in no way be caused by meteorological phenomena such as windstorms, droughts, excessive rains, which are caused by regional and supra-regional factors.

k. In the tables, the individual BAT (Bast Available Technologies) processes correspond, but the document does not address the sequence of individual processes and their impact on the environment. It does not consider the individual obstacles that will make life more difficult for the inhabitants in the immediate vicinity of mining and in the more distant period. It is not stated how the preparation time + the mining period itself will affect two generations (more than 25 years).

   The meaning of this comment is not entirely clear. All impacts are evaluated in the context of the entire life of the project.

l. The passages of the document on emission reductions are vaguely described. There is a lack of individual steps and corresponding studies confirming a real reduction in emissions. It is not stipulated who will control and how.

   The comment is not specific, it is not clear which passages it refers to. The dispersion study contains a detailed calculation of emissions and the method of their reduction. Measures to minimise the impact on air quality are listed in Part D.IV. This is a preliminary draft of measures. These measures will be further refined in the next phases of the preparation of the plan. As part of further project *preparation and permitting processes, the impact on air quality will also be the subject of proceedings for the issuance of binding opinions pursuant to Section 11 (1) of the Act. 2 lit. b) (for the determination of the mining area, for the zoning procedure, for the mining activity permit) and the decision on the operation permit pursuant to letter a) of the Mining Act. c) Act No. 201/2012 Coll., on Air Protection.*

m. The document emphasizes that the company is responsible for the construction and mining, listed on the stock exchange, and mentions the connection that the whole plan is a positive reality thanks to this. This claim is misleading. It is not stated how this conclusion was reached. There is no evidence that this should be the case.

   The text of the documentation does not state that the whole intention is a positive fact because of this. However, listing on stock exchanges (Canadian and Australian) is a guarantee of transparency due to the obligation to report on all company activities related to the project.

n. The document emphasizes that the investment of "considerable financial resources into construction and technology" means "the promise of a high standard of care for employees and a guarantee of their permanent social security." There is no evidence of how these two facts are related. The claim is misleading.

   The language used in the reminder differs from the text in the documentation, where the term "meaning" is not utilized. The socio-economic study (Annex No. 10) and other facts stated in the documentation in Chapter D.I.1 show a favourable assessment of the social and economic impacts of the project during the operation phase.

o. None of the effects in the document were assessed as "significantly unfavourable". There is a lack of methodology for classifying individual categories of influences. It is therefore not clear from the document how that assessment was made.

   On the evaluation methodology, see response to point 17.a. The processor of the documentation has been involved in the preparation of the intent for a long time, where the notifier and the designers of the individual sub-parts consulted on possible adverse impacts of the intent and the technical solution of the intent was continuously modified with the aim of minimizing these impacts. A fact-finding procedure was also used for this purpose.

p. The document discusses measures in the preparation phase. The word "minimization" is often repeated, but nowhere does it mention anything specific. There is a lack of individual procedures, impact studies, and who will control and how.

   The measures referred to in Chapter D.IV correspond in their nature and specificity to the level of preparation of the project. These measures are the basis for the formulation of the conditions for a possible affirmative binding opinion of the EIA, which will be issued by the competent authority. The conditions will become binding for decisions issued in subsequent proceedings. The measure is based on the assessment of the impacts of the project on individual components of the environment and public health. Control activities in the field of individual components of the environment are then carried out by the relevant state administration bodies (in this case the OBÚ, ČIŽP, KÚ, KHS, etc.).

q. Socio-economic and other effects are assessed as "favourable, i.e. zero or insignificant". There is a lack of methodology for classifying individual categories of influences. It is therefore not clear from the document how that assessment was made.

This is a verbal expert assessment based on the facts listed in Annex 10 and Chapter D.I.1.

r. The document states that the implementation of mining will be perceived by the public "certainly positively", as manganese as the cause of contamination will be removed. After remediation and reclamation, the newly landscaped area will be positively accepted by the public. However, he deliberately does not say that this could only happen after the period of preparation for mining and the mining itself, i.e. after more than 25 years, and even this is uncertain, as not all the affected municipalities have given a positive opinion. It also intentionally fails to address (although it mentions) that the construction of the mine and the mining itself evokes negative feelings and concerns about health, the environment and property. It is not described how this conclusion was reached and no solution is proposed.

The language used in the first and second sentences of the comment does not align with the wording found in the documentation and it seems to be a misinterpretation. As part of the public health impact assessment, it is only stated that the removal of the risk associated with the old environmental burden will certainly be perceived positively by the public. The duration of the project is clearly described in many places in the documentation, and therefore no intentional concealment can be said in any case. The impacts are evaluated in the context of the expected duration of the project.

3. Municipality of Trnávka, ref. no. 180/23 of 20.3.2023

In its statement on the documentation, the municipality of Trnávka states that on the basis of the Purchase Agreement signed on 11.5.2019 between the municipality of Trnávka and the company MANGAN Chvaletice, s.r.o., it will not comment on this documentation.

No comments.

4. Municipality of Kladruby nad Labem, ref. OUK-124/2023 of 20.3.2023

In its statement, the municipality of Kladruby nad Labem makes the following observations:

a) The published documentation for the environmental impact assessment of the project does not take into account the poor technical condition of roads II/322, III/3227 (transport of fuel, transport of chemicals, building materials, etc.). The increase in traffic due to the construction and the subsequent operation will definitely not contribute to the improvement of the state of the road and at the same time an increase in particulate emissions is expected.

See the response to part 1 of the statement of the municipality of Řečany nad Labem.

b) During the demolition of the current buildings, dust particles will fall over a long distance, certainly also in the surrounding villages.

When using conventional construction site dust reduction techniques, the risk of excessive dust during demolition is not significant. The conditions for environmental protection during demolition will be part of the decision of the relevant building authority to remove the building. A condition has been added to the measures for *reducing impacts in Chapter D.IV that air protection measures in accordance with the Methodological Guideline of the Air Protection Department of the Ministry of the Environment of the Czech Republic on Determining Conditions for Limiting Emissions from Construction Machinery and Other Construction Activities – September 2019 – has been added to the documentation for the removal of existing structures.*

c) The documentation does not include studies of light smog from the plant, which will have a negative impact on the environment.

The assessment of the impacts associated with light pollution has been added to the documentation, including the requirement to respect the new standard ČSN 36 0459 – Reduction of adverse effects of outdoor lighting (effective March 2023).

d) The documentation does not specify the carbon footprint from transport, production and environmentally friendly waste disposal.

See the response to point 8 in the statement of the municipality of Řečany nad Labem.

e) The expected emissions of hydrogen sulphide, manganese and sulphuric acid are absolutely unacceptable and will significantly affect the health of the population not only of the nearest municipalities (Trnávka, Řečany nad Labem), but also of those more distant such as Kladruby nad Labem, Selmice and others.

See the response to point 9 in the statement of the municipality of Řečany nad Labem.

f) Furthermore, the document does not specify how and how often noise will be measured and whether its limits are not exceeded.

The noise study has been fundamentally reworked, and the hygienic limits will not be exceeded due to the plan. The frequency of measurements will be set in the Acoustic Monitoring Plan, which will be discussed with the public health protection authority.

5. Municipality of Labské Chrčice from 18.3. 2023

In its statement on the documentation, the municipality of Labské Chrčice expresses its concern about the increase in noise and dust in the vicinity of the mining, as well as the deterioration and increase in transport services in the vicinity of the construction and mining and in the surrounding villages, as a result of how the plant will be built.

The municipality also points out that due to the planned mining period of 25 years, this is not a short-term outlook for such a load. It also points out that the documentation is based only on studies, and the actual noise and dust levels may vary to a large extent. The documentation also does not specify who will control and deal with any exceeding of noise limits.

The impacts on the noise situation and air quality are evaluated in detail in the documentation.

On the issue of transport, see the response to point 1 of the statement of the municipality of Řečany nad Labem.

Chapter D.IV of the dossier lists measures to prevent, eliminate and reduce all potentially significant negative impacts on the environment and public health. Among other things, there is a requirement for the elaboration of an Acoustic Monitoring Plan, including general requirements for noise measurement (based on the current statement, the municipality of Labské Chrčice has also been added to this list). Its details will be discussed with the public health protection authority in follow-up *proceedings. The Public Health Protection Authority (KHS of the Pardubice Region) is a supervisory authority. Acoustic measurements will be carried out after the start of the project operation and further as needed – e.g. When the noise situation changes due to a change in the operation of the surrounding projects and especially when the mining area is brought closer to the development of individual settlements. Noise measurements will be carried out in all potentially affected surrounding municipalities (Chvaletice, Trnávka, Řečany nad Labem, Zdechovice, Selmice, Labské Chrčice). Measurements may only be carried out by entities with accreditation or authorization within the meaning of Section 32a of Act No. 258/2000 Coll., on the Protection of Public Health, as amended. Penalties for exceeding the limits are within the competence of the KHS of the Pardubice Region. However, it should be stated that even with regard to the requirements of the KHS of the Pardubice Region, the requirements for noise protection measures have been increased to the requirements of the revised documentation and the plan will practically not affect the acoustic situation in the area at all and will not be the cause of exceeding the hygienic noise limits.*

The municipality of Labské Chrčice operates a municipal water supply system for local citizens and poultry fattening, and there is a concern about possible contamination of underground water sources. The documentation does not capture the possible contamination of groundwater caused by construction and mining. In addition, chemicals will be used in the technological process, one in large quantities, namely sulfuric acid.

It is clear from Annex No. 4 (Impact on water) that the implementation of the project will have a non-significant impact on the quantity of groundwater (it will not be affected) and a positive impact on the quality of groundwater (the project will eliminate the source of groundwater contamination). In addition, the village of Labské Chrčice lies on the right bank of the Elbe River, which forms a hydraulic barrier in the environment of the Quaternary collector. Any influences from the area of the project (whether negative or positive) would therefore not apply to the territory of the municipality of Labské Chrčice.

6. Municipality of Selmice from 20.3. 2023

In its statement, the municipality of Selmice expresses its disagreement with the project in question, namely in the area of increasing dust, noise, light pollution, and fundamentally disagrees with the construction of boreholes JV-1 and JV-2 according to the proposal in document Fig. 37. The municipality warns that there is already a shortage of water in the affected locality and that the wells built would make the situation even worse with their planned abstraction.

The municipality also expresses some doubts about the environmental benefits of the project and further states the following comments:

1. The document states that water in the daily amount of 500 m3 will be taken from newly built boreholes JV-1 and JV-2, located at the northeastern border of the DP. We fundamentally disagree with the location of the wells in question. Even if the wells are shallow. The amount of water taken can have an impact on the water levels in the wells of the inhabitants of Selmice. There is no water supply system in the village yet, so its own wells are the only source of drinking water in the Selmic cadastre.

The use of water from the JV1 and JV-2 wells was assumed only in the notification of the project. These water sources are no longer included in the documentation. However, the thesis from the above-mentioned response to the statement of the municipality of Labské Chrčice applies here as well. The Elbe forms a hydraulic barrier and any water abstraction would not affect the wells in the village of Selmice.

2. The document does not specify the method and schedule of noise inspections in the surrounding municipalities. It is obvious that there will be an increase in noise throughout the construction and subsequent operation, which will clearly affect the health of the inhabitants and partly also the animals.

Chapter D.IV of the dossier lists measures to prevent, eliminate and reduce all potentially significant negative impacts on the environment and public health. Among other things, there is a requirement for the preparation of an Acoustic Monitoring Plan, including general requirements for noise measurement (the municipality of Selmice is also mentioned here). Its details will be discussed with the public health protection authority in follow-up proceedings. The Public Health Protection Authority (KHS of the Pardubice Region) is a supervisory authority. Acoustic measurements will be carried out after the start of the project operation and further as needed – e.g. When the noise situation changes due to a change in the operation of the surrounding projects and especially when the mining area is brought closer to the development of individual settlements. Noise measurements will be carried out in all potentially affected surrounding municipalities (Chvaletice, Trnávka, Řečany nad Labem, Zdechovice, Selmice, Labské Chrčice). Measurements may only be carried out by entities with accreditation or authorization within the meaning of Section 32a of Act No. 258/2000 Coll., on the Protection of Public Health, as amended. Penalties for exceeding the limits are within the competence of the KHS of the Pardubice Region. However, it should be stated that even with regard to the requirements of the KHS of the Pardubice Region, the requirements for noise protection measures have been increased to the requirements of the revised documentation and the plan will practically not affect the acoustic situation in the area at all and will not be the cause of exceeding the hygienic noise limits.

3. The document provides a map of the project with respect to the nearest SCIs. We do not know why the cadastre of the village of Selmice was not included in the SCI. In the village there is a stud farm Františkov, which is an integral part of the National Stud Kladruby nad Labem. Just to clarify, we would like to point out that SCI – Louky u Přelouče is located only a few tens of meters from DP.

From the map of the project with respect to the nearest SCIs, it is also clear the location of these sites in relation to the territory of the municipality of Selmice. Also, in the documentation of the cadastre of the municipality of Selmice, in connection with the SCI, it is always mentioned in the description of those SCIs that are located in the territory of the municipality. Specifically, these are SCI Louky u Přelouče and SCI Kladruby nad Labem.

The distance of the project from SCI Louky u Přelouče (as well as other nearby SCIs) is stated in the introduction to the relevant chapter, where it is directly specified that: "In the vicinity of the project there is SCI Louky u Přelouče about 170 m to the west, SCI Kladruby nad Labem about 1 km to the north and SCI Týnecké wetlands about 2.4 km to the northwest."

A statement of the nature conservation authority was issued on the project pursuant to § 45 of Act No. 114/1992 Coll., on Nature and Landscape Protection, as amended, namely the opinion of the Regional Authority of the Pardubice Region, Department of the Environment and Agriculture of 24 March 2020 under Ref. No. 21444/2020/OŽPZ/Pe, which states that the Submitted Project, alone or in conjunction with other plans or concepts, cannot have a significant impact on the subjects of protection or the integrity of any Site of Community Importance or any Bird Area.

4. The document does not include the reconstruction of the overpass over the siding at ECHVA, and thus the designation of the alternative transport route along which the increased traffic will be conducted. It is quite obvious that there will be a deterioration in the condition of roads in the surrounding villages, which were not built for such a load and traffic. It is not described how the roads will be maintained or repaired and from what means.

Regarding transport in general, see the response to part 1 of the statement of the municipality of Řečany nad Labem.

Due to the proposed construction date, the comment regarding the overpass is not relevant.

5. The document shows an estimated annual diesel consumption of 1,000,000 litres and truck traffic of 500/day, resulting in an annual CO2 emission of 2,688 tonnes.

The expected diesel consumption applies to all diesel-powered mechanisms (including siding, mining and in-site transport). 500 trucks are an inaccurate number. The intention assumes the operation of about 100 cycles of the articulated dumper per working day (intra-site transport in the mining area, i.e. off the roads) along with additional service on public roads by 42 trucks per day.

The value of 500 trucks appears only in the capacity assessment of the intersection and it is a theoretical and artificially inflated value. Even with this exaggerated figure, the intersection's capacity remains sufficient, with a margin of reserve.

6. Some of the work according to the table in the document (drilling, truck and dump truck travels etc.) is to be carried out 12 hours a day. It is therefore more than obvious that overall noise, dust, fumes in the air and light pollution will increase. All these things will undoubtedly have a negative impact on the health and lives of people as well as animals and will have a negative impact on the landscape in the area and the overall deterioration of the environment of all surrounding villages.

The mining operation will be carried out in two shifts. This is taken into account as part of the assessment of all influences.

7. The village of Selmice is bordered on the south by the nearby Elbe River and on the other sides by the land of the National Stud Kladruby nad Labem, which means that it does not have the possibility of any construction of family houses. And so the new residents can only get to the village when they buy a house that was originally either for recreation or a senior citizen lived there. The operation of the nearby company Mangan Chvaletice, s.r.o. would thus cause that there would be no interest in houses in such an environment in Selmice, or their resale value would drop.

The economic indirect effect (potential change in the price of real estate) is not subject to the EIA assessment. However, the processor of the documentation does not find serious reasons for the decline in real estate prices, given the proposed measures to minimize potential negative effects. On the other hand, it cannot be ruled out that the removal of contamination with the simultaneous existence of a modern plant as a long-term employment opportunity may increase the demand for nearby real estate and thus cause an increase in real estate prices.

7. Regional Authority of the Pardubice Region, Department of the Environment and Agriculture, Department of Integrated Prevention, Ref. No. KrÚ 18797/2023/OPŽP/ST of 13.3.2023

- **Water Management Protection Authority**

No comments.

No comments.

- **Nature Conservation Authority (OOP)**

The Nature Conservation Authority of the Regional Authority of the Pardubice Region states the following comment (request) in its statement on the submitted documentation:

- With regard to the confirmed occurrence of a number of specially protected species (see Decree No. 395/1992 Coll.) or endangered species (see Red Lists), which is conditioned by the existence of areas poor in nutrients and therefore only sparsely covered with vegetation, the OOP considers the proposed extent of successional areas without humus substrate to be insufficient. The OOP requires this share to be increased to at least 10% of the total area covered by the submitted Comprehensive Plan of Remediation and Reclamation (approx. 129 ha). The OOP allows for the possibility that part of these successional areas will be sown with a special mixture for poor habitats (according to the selection consulted with the OOP), but without first covering the surface with a nutrient substrate.

The required area of approximately 12.9 hectares for successional areas without humus substrate means a relatively significant intervention in the draft of the Comprehensive Plan of Remediation and Reclamation, currently an area of 3.62 hectares is considered. It is necessary to take into account that only the upper plateaus of the individual tailings (approx. 62 ha) are available for the above-mentioned successional areas. The processor of the documentation considers the request of the Regional Authority to be justified in terms of impacts on biodiversity. In addition, increasing the areas of succession would make it possible to use humous material on planting plots of greater thickness, which would mean improved conditions for the growth of woody vegetation in particular. However, the final form of the reclamation must be a compromise between the requirements of various entities (municipalities, land owners, other state administration bodies). The requirement was therefore included in the measure in Chapter D.IV in the form of recommendations for further follow-up proceedings.

- **Waste Management Authority**

The Regional Authority of the Pardubice Region, as a state authority exercising state administration in the field of waste management (hereinafter referred to as the "Regional Authority") pursuant to the provisions of Section 126 (a) of the Waste

Management Act. j) of Act No. 541/2020 Coll., on Waste (hereinafter referred to as the "Waste Act"), has no objections to the submitted intent in terms of the interests entrusted to it by this Act.

We would like to point out that since 1 January 2020 (pursuant to the provisions of Section 146 (3) of the Waste Act), the municipal authority of the municipality with extended competence has been the subject-matter and locally competent administrative authority to issue a binding opinion or statement in terms of waste management in zoning or building proceedings.

No comments, no notice of legal requirements.

- **Accident Prevention Authority**

With regard to the fact that the investor will, as part of its plan, handle hazardous chemical substances and chemical mixtures classified according to Regulation (EC) No. 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC and amending Regulation (EC) No. 1907/2006, as amended, We draw their attention to the obligation pursuant to Section 3 of the Act on the Prevention of Major Accidents to prepare a list in which they shall state the type, quantity, classification and physical form of all hazardous substances located in the building (hereinafter referred to as the "List"), on the basis of which they will then sum up the proportional amounts of hazardous substances located in the building according to the formula and under the conditions specified in Annex No. 1 to the Act on the Prevention of Major Accidents and on the basis of the list and sum of the proportional amounts of hazardous substances located in the building prepares the protocol referred to in § 4 Art. 1, or proposes the classification of the building in group A or group B under the conditions set out in § 5 Art. 1 and 2 of the Act on the Prevention of Major Accidents.

As part of the preparation of the project documentation for the building permit, the investor will then submit a protocol of non-inclusion or a proposal for the inclusion of the building in the relevant group to the regional authority for registration and archiving.

No comments, no notice of legal requirements.

- **Integrated Prevention Authority**

The facility is subject to Act No. 76/2002 Coll., on Integrated Prevention and Pollution Control, on the Integrated Pollution Register and on Amendments to Certain Acts (the Integrated Prevention Act), as amended (hereinafter referred to as the Integrated Prevention Act). The facility will carry out the industrial activities listed in Annex No. 1 to the Integrated Prevention Act. Specifically, it is point 2.5. 'Processing of non-ferrous metals (b) (a) the production of crude non-ferrous metals from ore, concentrates or secondary raw materials by metallurgical, chemical or electrolytic processes'. The operator is obliged to submit an application for the issuance of an integrated permit to the authority. The requirements of the application are regulated by Annex No. 1 to Decree No. 288/2013 Coll., on the Implementation of Certain Provisions of the Integrated Prevention Act. We recommend that you consult the final form and scope of the application at the Department of the Environment and Agriculture of the Regional Authority, Department of Integrated Prevention, before it is officially submitted.

The Office would like to point out that the rights and obligations arising from the building permit or the joint permit by which the building is located and permitted, issued under special legal regulations, may be exercised no earlier than from the date of legal force of the integrated permit.

No comments, no notice of legal requirements. The EIA documentation contains in Chapter B.I.6 a mandatory comparison with the requirements of BAT, BREF.

8. Přelouč Municipal Authority, Department of the Environment, Ref. MUPC/3162/2023/OŽP/KH of 20.3.2023

- **Opinion from the point of view of Act No. 114/1992 Coll., on Nature and Landscape Protection**

No comments.

No comments.

- **Opinion from the point of view of Act No. 201/2012 Coll., on Air Protection and on Amendments to Certain Other Acts**

No comments.

No comments.

- **Opinion from the point of view of Act No. 334/1992 Coll., on the Protection of the Agricultural Land Fund**
- No comments.

No comments.

- **Opinion from the point of view of Act No. 289/1995 Coll., on Forests and on Amendments to Certain Acts (Forest Act)**

No comments.

No comments.

- **Opinion from the point of view of Act No. 185/2001 Coll., on Waste and on Amendments to Certain Other Acts**

No comments.

No comments.

- **Opinion from the point of view of the Building Department, from the point of view of Act No. 183/2006 Coll., on Spatial Planning and Building Code (Building Act)**

The assessed plan is not in accordance with the Land Use Plan of the Municipality of Trnávka, which is effective from 23.11.2005 including amendment No. 1 effective from 13.5.2010.

The assessed plan is not in accordance with the zoning plan of the town of Chvaletice, including amendment No. 2, which is effective from 20.11.2013.

Explanation:
The valid zoning plan of the municipality of Trnávka allows the land in question to be temporarily used for the needs of activities carried out in mineral mining areas, e.g. for landfills. However, it is not possible to use them for the actual mining area. In the town

of Chvaletice, amendment No. 3 of the zoning plan has not yet been discussed and approved – the plan is therefore still in conflict with the valid zoning plan. The information was sent to Mangan Chvaletice in the form of a statement on the intention in terms of spatial planning documentation on 15.4.2020, which was issued by our spatial planning office under ref. no. MUPC 7695/2020.

For spatial planning issues, see Part H of the documentation.

- **Opinion from the point of view of Act No. 13/1997 Coll., on Roads**

  No comments.

  No comments.

- **Opinion from the point of view of Act No. 254/2001 Coll., on Waters and on Amendments to Certain Acts (Water Act), as amended, and Act No. 274/2001 Coll., on Water Supply and Sewerage for Public Use and on Amendments to Certain Acts (Water Supply and Sewerage Act)**

  No comments.

  No comments.

9. Regional Public Health Authority of the Pardubice Region with its registered office in Pardubice, Ref. No. KHSPA 03178/2023/HOK-Pce of 14.3.2023

In its statement, the Regional Public Health Authority of the Pardubice Region requests the submission of a completed acoustic study, completed documentation and an assessment of the impacts on public health of the project according to the following comments:

a) Part of the documentation is a dispersion study prepared in December 2022 by RNDr. Marcela Zambojová, which deals with the pollution contributions of PM10, PM2.5, manganese in particulate matter, NO2, benzene, benzo(a)pyrene, H2SO4, H2S and NH3. These air pollution contributions are evaluated in the public health impact assessment prepared in December 2022 by Ing. Monika Zemancová, except H2S. Why were the H2S pollution contributions not evaluated in the public health impact assessment? The reported ammonia has the formula NH3, not NH4 as stated in the evaluation. In 2016, the US EPA re-evaluated the recommended annual concentration for ammonia in the IRIS database, the RfC = 0.5 mg/m3 is stated, which is not stated by the processor of the evaluation.

b) As already required in Comment No. 1 to the Notification of the Intent, KHS requires to include in the text of the AS a clear transport balance related to the operation of "Mining" and the operation of the "Plant", i.e. the number (movements) of TNA, LNA, OA per day, including the division of the numbers/movements of vehicles for day and night time and the division of the numbers (movements) of TNA (heavy trucks), LNA (light goods vehicles), OA (personal vehicles) on individual roads in the vicinity of the project (i.e. No. II/322, No. I/2 etc.). Also state the cumulative transport balance for the entire project, i.e. together "Mining" and "Plant". The text of the AS only mentions the transport balance related to the operation of the "Mining" area with the following vehicle journeys: 25 OA during the day and 25 OA during the night, 2 LNA during the day and 8 TNA during the daytime. LNA and TNA will not operate at night. The text of the AS does not state the transport balance related to the operation of the "Plant". From the picture on page 37 of the AS it is clear that the exit from the premises of the "Plant" is section 1 and on page 59 the number of vehicles per working day is shown in the table:

81.1 TNA, 22 LNA and 360 OA. The EIA documentation shows the number of OAs for "Plant" and for "Mining" per working day, but the numbers/movements of passenger vehicles during the day/night are not stated. The number of TNA is given as a summary for the entire intention for a working day, but the numbers/movements are not given separately for "Plant" and "Extraction", including the numbers/movements during the day and at night. The number of LNAs is given as a summary for the entire project for a working day, but the numbers/movements are not given separately for "Plant" and "Extraction", including the numbers/movements during the day and at night. For rail transport (in the EIA documentation on page 178 in Chapter 6. Requirements for transport and other infrastructure) trains to/from the site are listed only for one year. The KHS requires that the text of the EIA documentation should contain the same clear transport balance as in the text of the AS and that it should be unambiguous in both materials whether it is the number of vehicles or the movement of vehicles. For the mentioned trains, KHS requires to state how many wagons the train has and with what load capacity.

c) On page 64 of the AS there are variants for the calculation of traffic noise: year 2000, year 2025 without a plan (prospective state without a project), for 2028 without a plan (prospective state without a project), for 2028 with a plan YEAR 1 (prospective state with an intention in the 1st year of mining), for 2028 with a plan YEAR 3 (prospective state with an intention in the 3rd year of mining), year 2043 without intention (prospective state without intention), year 2043 with intention YEAR 18 (prospective state with intention in the 18th year of mining). Why is the 3rd year of mining marked as 2028 when 2028 is the 1st year of mining? If the first year of mining is 2028, then the 18th year of mining is 2046, not the stated 2043. KHS requires an explanation of the marking of the calculation variants.

d) In the case of a shift in mining by individual years, state in the text of the AS that the calculations from stationary noise sources of "Mining" were carried out for individual variants for the worst possible condition (at the closest approximation of the mechanisms to the residential development of the individual affected municipalities). If this is not the case, then KHS requires the submission of calculations for the worst states.

e) On page 112 of the AS there is a list of the implementation of noise protection measures on the premises of the Chvaletice Power Plant, which is spread over 7 years (2023 to 2029) marked as a background /22/. The document marked as /22/ was not submitted to the KHS. The time schedule stated in the AS does not correspond to the approved time schedule in the 32nd amendment of the integrated permit in the decision of the Regional Authority of the Pardubice Region for the facility "Combustion plant with a rated thermal input of more than 50 MW". On 25.11.2022, KHS commented on the amendment to the integrated permit for the facility "Combustion plant with a rated thermal input of more than 50 MW" under Ref. No. KHSPA 21898/2022/HOK-Pce. The timetable of the 4th stage of noise control measures is approved until 30.12.2024 with the optimization of the measures until 30.6.2025.

f) To verify the computational noise model, noise measurement was used in the AS – Authorized Noise Measurement Protocol AP-5182/21-10/G2-1, processed on 10.12.2021 by KONTRAHLUK, s.r.o., Thákurova 3/676, 160 00 Prague 6. The measurement was carried out in 2021, but the calculations indicate 2022 as the current state. This implies that the AS is based on the outdated noise situation for 2022.

g) On page 123 of the AS there are calculation variants for stationary noise sources. YEAR 1 is presented as 2028 with intention (prospective state with intention in the 1st year of mining) and YEAR 3 is presented as 2031 with intention (prospective state with intention in the 3rd year of mining). If the 1st year of mining is 2028, then according to KHS, the 3rd year of mining is 2030, not the stated year 2031. In addition, YEAR 6 is described as a prospective state with an intention in the 12th year of mining. KHS requires to unify the individual presented variants and years of calculation.

h) Model calculations from road transport, railway transport, stationary noise sources are performed for 54 calculation points, where it is not clearly stated which calculation points and the corresponding nearest CHVPS (=protected outdoor space, facades of buildings) correspond to individual noise sources. Relevant calculation points should be selected separately for rail transport, separately for road transport and separately for stationary sources, always indicating the relevant façade of the building facing the source of the assessed noise (already required in the notification of the intention in comment No. 5). Where appropriate, the calculation points shall be marked in such a way that it is clear from the marking whether noise from road transport, rail transport or stationary noise sources is assessed.

E.g. *in Table No.6.6.5A-2 on page 134 for the impact of car traffic there is a S Zdech for VB 26, in the table on page 101 it is described that it is the NE facade of Zdechovice 165. The impact of road No. I/2 should be evaluated, but on the S façade. The same calculation point VB 26 is also used to calculate the influence of stationary sources of the project. From this calculation point, the stationary sources of the "Plant" are about 2 km away, but in the case of stationary noise sources, it would be the NW façade, not the NE as shown in the table on page 101. This calculation point is also used to calculate railway transport, the railway is about 1.8 km north of this point. It is therefore necessary to explain for VB 26 which façade it is and with the influence of which noise source – stationary, traffic, so that the calculation point is oriented towards the source of noise and does not lie in an acoustic shadow.*

E.g. *VB 28 is located between road No. II/322 and the railway, according to the description on page 101 it is the W façade of the family house Stará pila 112, Zdechovice. The calculation point is used for calculations of stationary sources, for calculations from road and rail transport. However, the J façade is relevant for the impact of road transport, the S façade is relevant for the influence of the railway, but these relevant facades are not chosen for these noise sources.*

E.g. *In Řečany, VB 29 to VB 33 with W (SW) facades of the buildings are chosen, i.e. probably due to the influence of stationary sources. However, these facades are also used for calculations from road and rail transport, where for the influence from the railway and road No. II/322 it would be the southern facades. If the impact of the railway and road No. II/322 in Řečany were to be evaluated, then it would be necessary to choose calculation points that are closer to these noise sources than those selected in the acoustic study (e.g. Lesnická 427, buildings in U Nádraží Street, in 1. máje Street, etc.).*

E.g. *If the calculation points e.VB 34, VB 36 to VB 39 are used in Trnávka for the calculation of noise from road traffic on road No. II/322 and from railway traffic, then it is not possible to evaluate the W and NW facades of these buildings, but the southern facades of these buildings.*

Not all calculation points are listed, because there are 54 of them, which is not within the time possibilities of KHS. For this reason, KHS already required in the notification to divide the calculation points with the respective (correctly selected) facades to the individual assessed noise sources (comment No. 5 to the notification of the project).

i) Comment No. 11 on the notification of intent was also not complied with. The granting of a correction for the old noise burden is made incorrectly in the AS when the year 2000 is compared in the individual tables and with the year 2022 without the intention, the year 2000 should have been compared correctly with the prospective year with the intention.
***E.g.** description of VB 24 on page 101: S façade of the family house, Zdechovice 7, map treasure p. 105 – it follows that VB 24 is chosen for the influence of road No. I/2.*
Year 2000: 68.0 dB during the day and 61.7 dB at night (the hygienic limits of 60 dB during the day and 50 dB at night were exceeded).
The year 2028 with an intention: 68.3 dB during the day, 62.5 dB at night.
The difference between 2000 and 2028 with intention is +0.3 dB in daytime and +0.8 dB at nighttime.
However, Table 6.6.5A-2 shows a difference (green column) of 0.1 dB during the day and 0.0 dB at night, i.e. the difference between 2028 without intention and 2028 with intent. The difference between the year 2000 and the prospective year with the intention is not stated.
For this VB 24, a correction for the old noise load can be granted for communication No. I/2, i.e. a limit of 70 dB during the day and a limit of 60 dB at night. At night, the hygienic limit of 60 dB is also exceeded for the calculation years with the intention, but due to the intention there is no change in the noise value (increase 0 dB).

j) Why are the values of road traffic noise for the year 2000 given for the calculation points VB 6 to VB 11, when the author of the acoustic study states that the route of road No. II/322 - the Chvaletice bypass was not in operation before the year 2000? In 2000, noise from the bypass could not exist. The bypass was approved in 2013.

k) For the operation phase, page 412 of the documentation states, and I quote: "*The siding may be operated only during daytime hours (6:00 a.m. – 10:00 p.m.) – it concerns the entry and exit of trains to/from the premises, the movement of trains on the siding and the loading/unloading of piece goods. Sulphuric acid bottling and pneumatic lime unloading can also be carried out at night, provided that the wagons are moved by a winch or an electric pusher*." Railway transport related to the project should be included in the stationary sources of the project. If it is not included, then KHS requires the calculation of the impact of stationary sources to elaborate the noise sources related to railway transport, including the description of the operation of noise sources during the day/at night.

l) On pages 26 and 28 of the AS it is stated that the "Mining" area will be in operation only during daytime hours. In the annexes to the AS showing the outputs of the calculations in the form of isolines, it is evident that noise sources are specified for the mining facilities with operational objects even at night (probably it is the material conveyor to the plant and the undescribed noise sources of the mining facilities). The KHS unambiguously requires the operation of stationary noise sources in the "Mining" area to be described in the text part of the AS (which noise sources are involved, which are in operation during the day and which are also at night).

m) At the calculation points in Hornická Čtvrť (VB 17 to VB 23) from stationary noise sources from closed areas in the area, in the current state in 2022, in 2025 without a plan and in 2028 without a plan, in 2031 without a plan, exceeding the hygienic limits of 50 dB/40 dB in the calculation points VB 17 is predicted without a plan, VB 18, VB 19, VB 23 during the day (from 51.0 dB to 53.0 dB), at calculation points VB 20 to VB 23 at night (from 40.1 dB to 42.7 dB).

KHS does not have any other noise measurement in the Hornická Čtvrť that would prove that the hygienic limits are exceeded during the day and at night, as stated by the author of the acoustic study. The AS does not evaluate the variant of how the contribution of the assessed project in the Hornická čtvrť affects the hygienic limits of 50 dB during the day and 40 dB at night.

n) Already in the notification of the plan, the KHS was required in comment No. 12: "*In the assessed locality, the hygienic limit is already exceeded at night from the operation of the Chvaletice power plant, which is gradually implementing noise protection measures according to the schedule, which gradually lead to compliance with the hygienic limit. The contribution of the assessed project must not predict the deterioration of the hygienic limits of 50 dB during the day and 40 dB at night in the nearest CHVPS surrounding municipalities*". Again, this option was not elaborated in the submitted documentation, nor in the AS. With regard to the fact that this is an area with a long-term noise burden from the operation of the Chvaletice Power Plant at night, in the village of Trnávka, it is not possible to agree with the further location of noise sources without a proposal for noise control measures. KHS continues to insist on the completion of the above-mentioned variant.

In December 2022, the Regional Authority of the Pardubice Region issued a decision on the operation of an above-limit noise source, i.e. stationary noise sources on the Chvaletice Power Plant complex, in the 32nd amendment to the integrated permit for the "Combustion plant with a rated thermal input of more than 50 MW". This is a time-limited permit with a set schedule of noise protection modifications, which is to be used for the gradual implementation of noise control modifications on noise sources so that the hygienic limit for the night time (40 dB) set out in Government Regulation No. 272/2011 Coll., as amended, can be achieved in the future. In the 32nd amendment to the decision on the integrated permit, the operation of stationary noise sources on the premises of the Chvaletice Power Plant is permitted with a noise exposure of up to 46 dB of equivalent sound pressure level at night in the municipality of Trnávka until 31 August 2025 and up to 43.5 dB of equivalent sound pressure level at night until 30 June 2035 in the municipality of Trnávka.

In the documentation on page 403 in Chapter III, the author of the documentation evaluated the significance of the impact as unfavourable for the operation phase of the project in terms of the impact of noise from stationary sources. The KHS agrees with the processor of the documentation and requests the completion of the documentation in the noise section, including the completion of anti-noise measures (not only for the Hornická čtvrť, but also for the municipality of Trnávka).

The acoustic study was fundamentally reworked, responding to all the above comments.

Therefore, these comments are not further elaborated in this text, given that the revised acoustic study was reviewed and discussed with the public health protection authority as part of a preliminary hearing pursuant to Section 15 of Act No. 100/2001 Coll. It is clear from the results of the discussion that the comments of the KHS were accepted and respected. On 30 August 2023, KHS commented on the revised documentation as part of the preliminary hearing under ref. no. KHSPA 16593/2023/HOK-Pce, with 6 specific comments made as part of this statement. The acoustic study was still found to be *insufficient for assessment by the public health protection authority and a request for its further refinement was applied. As part of the further revision of the acoustic study, the 6 comments of the KHS were taken into account. The acoustic study was then preliminarily discussed again. KHS commented on the acoustic study modified in this way on 26.9.2023 under ref. no. KHSPA 19030/2023/HOK-Pce. It follows from the statement that the comments of the KHS have been added to the acoustic study. No further comments were made by KHS.*

In particular, the updated acoustic study includes the re-evaluated and updated acoustic parameters of the plant's equipment according to the project documentation for the zoning decision (DUR), which specifies the parameters of the plant's equipment (TRACTEBEL ENGINEERING a.s., from 06/2023). The computational model is therefore updated, acoustic modifications of individual devices are proposed and increased sound insulation of buildings in the area of the processing plant and mining area is proposed. This took into account the requirement of the KHS of the Pardubice Region, on the basis of which the assessed project must not in any way worsen the unsatisfactory (above-limit) acoustic situation in the municipality of Trnávka, even if the noise from the existing noise sources in the area would reach the hygienic limit LAeq,1h = 40 dB for the nighttime in Trnávka. This proves that after taking into account the noise sources of the assessed project, the value of 40 dB will not increase by even 0.1 dB for the entire duration of the project. The updated acoustic study has been adequately incorporated into the relevant chapters of this documentation, in particular chapters B.III.4., C.I.10 and D.I.3. Requirements for measures to minimise noise effects are given in Chapter D.IV.

On the basis of the revised acoustic study, the impact on the acoustic situation, and thus the associated impact on public health, was evaluated as insignificant.

10. Czech Environmental Inspectorate, Regional Inspectorate Hradec Králové, ref. ČIŽP/45/2023/1339 of 27.2.2023

No comments.

No comments.

11. District Mining Authority for the Hradec Králové and Pardubice Regions, Ref. No. SBS 07458/2023/OBÚ-09/1 of 23.2.2023

No comments.

No comments.

12. Povodí Labe, s.p., Department of Water Resources Management, Ref. No. PLa/2023/007937 of 9 March 2023

The Elbe River Basin Administrator (IDVT10100002) of the Elbe River Basin Authority, s.p., states in its statement that from the point of view of the interests given by the valid National Elbe River Basin Plan and the Plan of the Upper and Middle Elbe Sub-Basin, the submitted plan is possible.

No comments.

13. Statement within the Ministry of the Environment

- **550 – Department of State Administration of 10.3.2023**

  No comments.

No comments.

- **610 - Department of Adaptation to Climate Change, ref. MZP/2023/710/486 of 20.2.2023**

  No comments.

  No comments.

- **630 – Department of Species Protection and Implementation of International Commitments of 8.3.2023**

  No comments.

  No comments.

- **640 – Department of Water Protection, ref. MZP/2023/640/268 of 10 March 2023**

In the matter of ensuring water quality, it is required that continuous monitoring of the quality of surface water (present in the riverbed and retention tanks) and groundwater is carried out in the area of the sludge ponds and the plant during the actual implementation of the project (especially the actual mining and reclamation activities on the tailings). From the point of view of long-term evaluation, it would be appropriate to carry out monitoring of groundwater quality within a reasonable time after the completion of all works (including monitoring of the quality and quantity of groundwater also in the wells of the inhabitants of the relevant municipalities in the vicinity that may be affected by the project).

Department 640 of the Ministry of the Environment also points out that in the event of a deterioration of the monitored parameters, it is necessary to take appropriate corrective measures operatively.

It is also required to add the sentence "all activities during the construction and operation of the implemented project must be carried out in accordance with the Water Act to a suitable place (e.g. Chapter 1). D.4 of the EIA Notification).

Chapter D.IV specifies the requirement for the design and implementation of hydrogeological monitoring.

The requirement to add the sentence according to the last paragraph (i.e. to act generally in accordance with the law) cannot be accepted in this way for methodological reasons. The methodological communication of the Ministry of the Environment OPVIP for authorisation holders dated 6.3.2015, ref. no. 18130/ENV/15 implies, among other things, the following: In Chapter D.IV. of the documentation (Measures to prevent, eliminate, reduce, or compensate for adverse effects), it is essential to include only pertinent, achievable, and specific conditions. Conditions stemming from applicable legislation should either be omitted or integrated into another section of the documentation as part of the plan. The declaration of an obligation to comply with legal obligations cannot be considered as a proposal for measures to prevent, eliminate, reduce or compensate for adverse effects.

Nevertheless, the intention is designed in such a way that the legal requirements will be met.

- **660 – Field of geology dated 21.3.2023 (sent after the deadline for comments)**

  No comments.

- **710 – Department of Environmental Impact Assessment and Integrated Prevention, IPPC and IPR Unit dated 17.3.2023**

  The statement points out that the comparison of compliance with the BAT conclusions is preliminary at the moment (without knowledge of the specific technology used), which corresponds to the level of processing of the comparison. A comparison with the so-called general conclusions on BAT is sufficiently elaborated in the documentation. For many of the BATs, which are already more specific, compliance is stated, although the compared parameter only refers to future project documentation.

  It is also pointed out that the application of the BAT conclusions for CWW (Best Available Techniques (BAT) Reference Document for Common Waste Water and Waste Gas Treatment concerns activities listed in categories 4 and 6.11 of Annex 1 to the Integrated Prevention Act and, where applicable, the BAT conclusions also apply to combined treatment of wastewater from different sources, where the highest pollutant load arises from activities falling under category 4 of Annex 1 to the Integrated Prevention Act.

  As mentioned above, a more detailed comparison of compliance with the relevant BAT conclusions only needs to be carried out once the specific technological installations are known, i.e. only in the context of the integrated permit procedure. With regard to the lifespan of the processing plant, we recommend that you pay special attention to the termination of the operation when issuing an integrated permit (Section 15a of the Integrated Prevention Act).

  The department has 710 other comments on the submitted documentation itself.

  No comments, no notice of formal requirements.

- **750 – Department of Environmental Risks and Environmental Damage, dated 15.2.2023**

  No comments.

  No comments.

- **810 – Department of Energy and Climate Protection of 20.2.2023** No comments.

  No comments.

- **820 – Department of Air Protection, ref. MZP/2023/820/525 of 16 March 2023**

  In its statement on the documentation, the Department of Air Protection made the following comments:

  - It is essential that the dust control measures specified in the submitted dispersion study in Chapter 7.1.7 are fully implemented. (Measures to limit emissions from operation in the tailings area), as well as to fully implement the measures to reduce the nuisance of the environment by odour and dust specified in the submitted documentation in Chapter d) Comparison with the best available techniques (BAT).

    The requirement for the implementation of these measures is contained in Part D.IV of the documentation. This is a preliminary draft of measures. These measures will be further refined in the next phases of the preparation of the plan. As part of further project preparation and permitting processes, the impact on air quality will also be the subject of proceedings for the issuance of binding *opinions pursuant to Section 11 (1) of the Act. 2 lit. b) (for the determination of the mining area, for the zoning procedure, for the mining activity permit) and the decision on the operation permit pursuant to letter a) of the Mining Act. c) Act No. 201/2012 Coll., on Air Protection.*

- The notifier states that the process part, i.e. the treatment of manganese ore by magnetic separation and electrowinnig, does not have a corresponding classification in Act No. 201/2012 Coll., on Air Protection. Inclusion under code 4.7 would be considered. (Treatment of non-ferrous metal ores). However, the emission limit corresponding to this activity according to Decree No. 415/2012 Coll., on the permissible level of pollution and its determination and on the implementation of certain other provisions of the Air Protection Act, is set only for pollutants in the amount of 50 mg/m3 (point 3.6.1 of Annex No. 8). The notifier declares that this emission limit will be met with a reserve. In this regard, the Air Protection Department states that even if this part of the technology is not included in Annex No. 2 to Act No. 201/2012 Coll., on Air Protection, it is possible to impose operating conditions for it in accordance with Section 12 (1) of the Air Protection Act. 4 lit. f) of this Act, namely with regard to the connection of this stationary source with the operation of mining classified under code 5.11., for which the operating permit will be issued.

It is a declaration of legal obligations that will be respected in subsequent proceedings.

- The dispersion study does not evaluate whether and how often the value of 50 μg.m-3 is exceeded within a calendar year, and therefore it is not evaluated whether the valid pollution limit value, which allows 35 exceedances of this value in a calendar year, is exceeded. However, it can be estimated from the attached wind rose that the daily pollution limit value for suspended particles PM10 could be exceeded at selected reference points (especially RB3) under poor dispersion conditions (i.e. more than 35 exceedances of the value of 50 μg.m-3 per calendar year can be assumed).

The results of the calculation of short-term air pollution concentrations of PM10 are presented in Chapter 9.1 of the dispersion study, including a discussion of the results concerning the possibility of exceeding the pollution limit value. The limit value is not expected to be exceeded.

- During the construction period, it will be necessary to strictly adhere to the measures to minimize the impact on air quality, which are specified in Chapter D.IV of the documentation, because in case of poor dispersion conditions, the pollution limit set for the average daily concentration of suspended particles PM10 may be exceeded.

The requirement to comply with the measures is stated in the documentation, including the requirement to incorporate measures for air protection in accordance with the Methodological Guideline of the Air Protection Department of the Ministry of the Environment of the Czech Republic on Determining Conditions for Limiting Emissions from Construction Machinery and Other Construction Activities – September 2019.

- Please also note that the documentation contains minor typos, e.g. dourava instead of doubrava, mosaisc instead of mosaic, electrificed line instead of electrified line, and others.

- **840 – Department of Environmental Policy and Sustainable Development, dated 14.03.2023**

  In its statement, the Department of Environmental Policy and Sustainable Development makes the following observations:

  - The notification of the project does not reflect the light emissions that the project will generate. Although the detail of the documentation is not sufficient to describe a specific lighting and technical solution, it can be assumed that the project will include the installation and operation of several lighting systems in all its phases and activities. The light emitted from these lighting systems can affect the environment in the project's surroundings, as well as, for example, noise, as mentioned in Chapters B.3.4. and D.1.3. Like noise, light can spread over long distances in space and have a negative effect on the health and condition of various animal and plant species (including specially protected animal species that were found on the project site during surveys), the night landscape and the sky. This influence is all the more relevant because there are specially protected areas in the vicinity of the project according to Act No. 114/1992 Coll. – the closest to the Týnecké modřiny Nature Reserve, the Labské rameno Nature Reserve, the Na Hornické Nature Reserve, as well as the Iron Mountains Protected Landscape Area, i.e. areas that are very sensitive to light pollution. According to the documentation, the mining area of the project also falls within the protective zone of the national cultural monument Stud Farm in Kladruby nad Labem with significant urban and landscape values, which can also be significantly affected by light pollution.

    The Department of Environmental Policy and Sustainable Development recommends supplementing the documentation with an assessment of the impact of light emissions on the surrounding night environment according to the methodological guideline for the prevention and reduction of light pollution of the Department of Environmental Impact Assessment and Integrated Prevention of the Ministry of the Environment, Ref. No. MZP/2020/710/2387.

  - Furthermore, the Department recommends to the notifier of the project to ensure that the lighting systems installed and operated in all phases and activities of the project are in accordance with the parameters of the new Czech technical standard ČSN 36 0459 Reduction of undesirable effects of outdoor lighting, which can be found at the link: https://csnonline.agentura-cas.cz/Detailnormy.aspx?k=516634.

    The issue of light pollution has been added to the documentation, namely to Chapter B.III.4. and D.3. In Chapter D.IV there is a clear requirement to respect the new Czech technical standard ČSN 36 0459. At this stage of project preparation, this is considered sufficient.

14. Chvaletice Power Plant (through the authorized representative JUDr. Petr Zákoucký, LL.M.) dated 20.3.2023

In its statement, the Chvaletice Power Plant, represented by JUDr. Petr Zákoucký, LL.M., makes the following observations:

4. Given the nature, complexity and scope of the project, it can be assumed that the project will have a significant negative impact on the environment. The dossier does not contain sufficient measures to guarantee that there will be no significant negative impact on the environment. The Chvaletice Power Plant does not consider the conclusions stated in Part D of the Documentation (Comprehensive Characteristics and Assessment of Potential Significant Impacts of the Project on the Environment and Public Health) to be credible.

   Claims without justification.

5. The Chvaletice Power Plant considers that for the purposes of/as a result of the implementation of the project, the following will be in the relevant area:

a) significantly increased dustiness, which will negatively affect the living conditions of the inhabitants of the municipalities in the vicinity of the project (especially Trnávka, Selmice and Chvaletice),

   Considerable attention was paid to the issue of impacts on air quality, including the proposal of measures to minimize these effects. There will be no significant increase in dust in the surrounding municipalities.

b) As a result of the operation of stationary sources, the noise burden is significantly increased, while the hygienic limit is already exceeded at night in the assessed locality from the operation of the Chvaletice Power Plant, which, in accordance with the granted exemption, is gradually implementing noise protection measures according to the schedule in its integrated permit. Although these measures will gradually lead to compliance with the hygienic limit, the burden of another significant source of noise on the site may have significant negative impacts, especially on human health.

   The issue of the impact on the noise situation has been fundamentally revised (see the response to the statement of the KHS of the Pardubice Region). The intention will not worsen the acoustic situation by 0.1 dB in places where the hygienic limit has been exhausted, even if the existing sources are gradually attenuated until the state of compliance with the hygienic limit LAeq,1h = 40 dB at night.

c) it is necessary to permanently occupy selected plots of land from the agricultural land fund,

   The occupation of the ZPF is evaluated in the documentation. The vast majority of the area of the project is located on non-agricultural land. The occupation of the ZPF is proposed on an area that is absolutely necessary for the implementation of a comprehensive remediation of tailings. The impact associated with the annexation of the ZPF is evaluated in the documentation.

d) long-term (at least for the duration of mining and reclamation) affected fauna, especially in the area of mining and plant – populations or individuals of rare and specially protected animal species will be liquidated or damaged, *These impacts are evaluated in the documentation, including proposals for measures to prevent, reduce exclusion and compensate for potential negative impacts.*

e) long-term (at least for the duration of logging and reclamation) affected flora, especially in the area of mining and plant – trees and stands of woody plants growing outside the forest will be liquidated or damaged,

These impacts are evaluated in the documentation, including proposals for measures to prevent, reduce exclusion and compensate for potential negative impacts.

f) long-term (at least for the duration of mining and reclamation) affected biodiversity, ecosystems and biotopes, especially in the area of mining and planting.

These impacts are evaluated in the documentation, including proposals for measures to prevent, reduce exclusion and compensate for potential negative impacts.

6. At the same time, the mechanisms for limiting or compensating for the above-mentioned negative impacts listed in the documentation cannot be considered sufficient.

Claims without justification.

15. Jan Beran, 20.3.2023

Mr Beran's statement makes the following observations:

1. Transport of hazardous chemicals by rail and then by siding to the production plant

- The protection of the health of persons in the immediate vicinity of the stabling tracks of the railway station in Řečany nad Labem, where there is also a passenger platform, which is used mainly by children for travelling to and from school, is not addressed. We completely disagree with this manipulation. The stabling tracks were built for the purpose of transporting coal and not for the transport of chemicals. The priority of the siding continues to be the coal handling of the Chvaletice power plant.

The risks arising from the transport of chemicals are not underestimated in the documentation, however, these are standard commodities that are commonly transported by rail in compliance with the relevant safety regulations. The transport of an average of one train per day will not limit or complicate the operation at the railway station in Řečany nad Labem.

2. Mining

a) Dustiness: dust with heavy metals – the possibility of contaminating other plots of land and endangering the health of people in adjacent villages. It is not realistic to ensure dust-free with regard to the higher altitude above the surrounding landscape, especially in the summer months. The mined material is ash-like, the mining site cannot be moistened as it is also very sticky, it is only possible to sprinkle the driveways.

The impacts on air quality are evaluated in the documentation, and a dispersion study (Annex No. 2) is prepared, which evaluates the pollutant emissions in the entire vicinity of the project. With regard to the objection, it must be stated that in *the case of the mined raw material, i.e. the material from which the tailings are built, it is not ash, the original ore was not subject to combustion. It is a waste from flotation, i.e. the original rock from the Chvaletice pyrite deposit, which was modified to a fine fraction by crushing and grinding and subsequently, the utility component was separated from it in the aquatic environment. This material currently contains very high moisture throughout the profile, it is almost mushy in consistency, and therefore the loading from the mining wall will be dust-free. The material will be loaded in a damp state, in case of its local drying it can be moistened.*

The requirement for the implementation of measures to minimise air impacts is included in the documentation in Part D.IV. This is a preliminary draft of measures. These measures will be further refined in the next phases of the preparation of the plan. As part of further project preparation and permitting processes, the impact on air quality will also be the subject of proceedings for the issuance of binding opinions pursuant to Section 11 (1) of the Act. 2 lit. b) (for the determination of the mining area, for the zoning procedure, for the mining activity permit) and the decision on the operation permit pursuant to letter a) of the Mining Act. c) Act No. 201/2012 Coll., on Air Protection.

b) Working hours 6-22 on weekdays and in the report there is also room for mining on weekends and holidays. This is absolutely unacceptable with regard to the normal life of the inhabitants of the surrounding villages, which are also in the 1st and 2nd zones of UNESCO protection, so also with regard to tourists.

The standard operation of the mining itself is only during the daytime on weekdays. It is calculated with 250 days per year, and even in this number of days a reserve is already included. Mining on weekends is considered only in exceptional cases. However, as the acoustic study shows (see also the next point), the noise level of the mining itself during the daytime is not perceived as problematic not only in terms of hygiene limits, but also in terms of nuisance.

c) Noise is also downplayed in the report, again due to the higher exposure, the noise will spread more significantly and will affect the inhabitants of the surrounding villages, especially in the evening.

As the acoustic study shows, the project will not exceed the hygienic limits during mining between 6 a.m. and 10 p.m., on the contrary, in most of the surrounding settlements, the noise will be significantly below the hygienic limit for most of the mining period (the contributions of the project will be mainly below 40 dB and usually below 30 dB). Such noise values are below the level of normal municipal noise and the current load on the territory, so the noise will not be measurable separately. Only in the case of mining approaching the village of Trnávka (after the 20th year of the project's existence) can the noise in some situations close to the position of mining machinery approach the hygienic limit in this village. Regular acoustic monitoring is expected and measures to protect against noise are proposed.

Regarding the downplaying of the information, it can only be stated that extraordinary attention was paid to the effects on the acoustic situation and the revised acoustic study was preliminarily discussed with the public health protection authority within the meaning of Section 15 of Act No. 100/2001 Coll. It is clear *from the results of the discussion that the public health protection authority has no further comments on the submitted revised documentation.*

In his statement, Mr. Beran also points out that the representatives of MANGAN Chvaletice, s.r.o., during negotiations with municipal representatives, as well as public negotiations, intentionally and falsely minimized the impact on the environment and concealed important data on mining and recycling. Furthermore, the EIA report downplays the impact on the environment and relies on assumptions rather than the actual condition of the extracted material and the surrounding environment in different climatic conditions and seasons.

The processor of the documentation is not aware of any deliberate misinformation or attempts to downplay the effects on the part of the investor. In this documentation, the impacts are evaluated according to recommended and binding methodologies and the impact assessment has been approached conservatively (i.e. with a reserve on the safe side) with regard to the state of project preparation.

Concerning the effects on public health, it should be noted that their assessment is always based on the long-term exposure of the population to the relevant pollutant (noise, specific pollutants in the air). Therefore, meteorological factors (e.g. frequency of wind directions and wind speeds throughout the year) are already taken into account in the relevant dispersion and noise study methodologies.

Settled comments on the notification of intent

Commented on the EIA Notification by:

1. Town of Chvaletice
2. Municipality Řečany nad Labem
3. Regional Authority of the Pardubice Region, Department of Environment and Agriculture
4. Přelouč Municipality, Department of Environment (municipality with extended competence)
5. Regional Hygiene Station of the Pardubice Region, based in Pardubice
6. the Czech Environmental Inspectorate, Regional Inspectorate Hradec Králové
7. District Mining Office for the territory of the Hradec Králové and Pardubice Regions
8. Ministry of Culture, Department of Heritage Protection, Department of Regeneration of Cultural Monuments and Protected Areas
9. National Heritage Institute, General Directorate
10. Elbe River Basin, s.p., Department of Water Resources Care
11. Statements within the Ministry of the Environment (Department of General Nature and Landscape Protection; Department of Species Protection and Implementation of International Obligations; Department of Waste; Department of Water Protection; Department of Environmental Risks and Environmental Damage; Department of Air Protection)
12. Hunting Association Řečany nad Labem

13. Ing. Pavlína Hamáčková Muchová, Ph.D.

In the following, the individual comments and their relevance are listed. *The response of the preparer is in italics.* Where the issue has already been addressed elsewhere, reference is made to this response in the text.

The responses here are left in the original (not revised) documentation. For current reactions, see above.

1. City of Chvaletice, No. CHVA-4035/20/STAR/ZMa dated 3.9.2020

The City of Chvaletice places the greatest emphasis on compliance with technological, technical and operational parameters of mining, as well as on noise and employment issues directly related to mining. The town has set the following as requirements:

a) Requirement for strict compliance with all parameters of raw material extraction, including processing and subsequent disposal. At the same time, the City requires the design of mining parameters that will minimize any negative impacts associated with mining activities, at all stages of mining (preparation, operation, abandonment, reclamation reclamation). In particular, the City's emphasis is on ensuring independent monitoring of compliance with the mining parameters during all phases of mining.

The requirement is formulated as a general one. The subject of the environmental and public health impact assessment is precisely the evaluation of all potentially significant negative impacts and the proposal of measures for their prevention, avoidance and reduction. The EIA documentation assesses all phases of the project. The EIA opinion contains these measures in the form of binding conditions, which will be incorporated into the decisions issued in subsequent procedures. The control of the set measures will be ensured by the relevant state administration authorities (Czech Environmental Inspectorate, District Mining Office, Regional Office of the Pardubice Region, etc.).

b) Requirement to carry out all acoustic modifications proposed by the acoustic study, in particular:

- the addition of an acoustic screen along Route 322 in Chvaletice, with the City requesting that the acoustic wall be designed to allow for maintenance of the surrounding grasslands

A measure in the form of the construction of an acoustic barrier at the II/322 road is proposed within this project - see Chapter D.IV. The detailed technical design of this construction will be part of the next stages of the preparation of the project, however, the requirement to allow maintenance of the areas is included in the measure.

- restriction of the operation of the siding in the project area at night and movement of trains only during the day

A measure in the form of restricting the operation of the siding during night hours is proposed as part of this project - see chapter D.IV.

- operation in the mining area will be carried out only according to Option A and only during the day

Option B has been dropped. The transport of raw material and mining waste will be carried out only by dumpers and only during daytime hours.

- organizing the operation so as to minimize traffic during the night hours (between 10 pm and 6 am) and therefore no transport of employees to/from work at this time

The operation of the plant will be a three-shift operation, therefore the transport of employees between 22:00 and 6:00 cannot be completely excluded. However, the impact of passenger traffic on the noise situation will not be significant and the construction of an acoustic screen is proposed as a minimisation measure - see above.

- carrying out noise control measurements after the start of the project, subsequent verification of compliance with noise limits and, if necessary, the adoption of further noise protection measures

The requirement for noise measurement is included in the proposal for measures to prevent, avoid and reduce negative effects, see Chapter D.IV. Measures are also proposed in the event that a non-compliant situation is detected. Further refinement is expected in the next stages of project preparation.

c) Requirement to use rail transport and sidings for transporting material to and from the processing plant due to possible road congestion, increased noise and emissions from the use of road transport. The requirement applies to both the construction of the plant and the actual operation.

The investor's intention is to start the permitting process and the actual construction of the siding in advance of the construction of the processing plant itself and then use it, if possible, in the actual construction of the plant.

However, it is not realistic to use the siding to its full extent during the construction period. Most common construction materials and materials can only be transported by truck.

For the operational period, emphasis was placed on maximum use of rail transport.

d) *In contrast to the announcement of the plan, the use of soil excavated during the construction of the plant for the rehabilitation and reclamation of the tailings is envisaged. The transport of remediation soils will therefore be reduced, which was expected to be imported from other distant locations.* Requirement to develop and professionally assess the technologies to be used in the processing plant. The City of Chvaletice places particular emphasis on the assessment of the technology for processing magnetic separates in terms of the potential impact on the health of the population and the environment.

This requirement is the subject of the impact assessment in this EIA documentation. All associated impacts are assessed.

e) Requirement to consult with municipalities on the appearance and use of the reclaimed area during the next stage of project preparation.

Furthermore, the city proposes that safe access to the reclaimed area for the citizens of Chvaletice (including citizens with strollers, the handicapped and cyclists) should also be addressed in the next stages of the project.

The use of the reclaimed area is assumed to be similar to the discovery phase, when the proposed use was discussed with the municipalities and the public and the requirements of the state administration authorities were accepted. There are no major changes here. The idea is to create a natural environment with the possibility *of extensive recreation. However, it is envisaged that more detailed rehabilitation and reclamation plans (for the designation of the mining area and for the authorisation of mining activities) will be drawn up in subsequent procedures, which may take into account more detailed requirements of citizens or communities arising from the EIA process.*

In the current version of the SPSR, the design of access roads is more detailed and will be twofold. The main roads will allow access for service equipment and, if necessary, for emergency vehicles. The design of their routes provides access to the area through the entire valley up to the dam and also to each of the dumps. In addition to the main roads, there are pedestrian paths, but even these, with a minimum width of 1.5 m, will allow the safe access required by the town of Chvaletice for prams, disabled people or cyclists.

The whole area is designed as open countryside, free of obstacles, so that it can be passed through off-road, e.g. when walking dogs, mushroom picking, etc. It will not be an enclosed area, its boundary will flow seamlessly into the adjacent landscape. The exception to this is the western part of the site, where a pipe runs through the site to take cooling water from the Chvaletic power station. The pipeline is impassable in the terrain due to its massiveness, which is why a footbridge is proposed as part of the rehabilitation and reclamation. This will take people to the forest park area and then to the banks of the Elbe.

f) Requirement to prepare a more accurate and comprehensive sociogeographical analysis of the current state and future development, which will assess the possible impacts of the company's location on the social environment of the surrounding villages. The town sees a problem in particular in the future provision of a sufficient number of employees for the processing plant and opposes the possible future construction of hostels in the town's cadastral area if agency or foreign employees are hired, with the need to provide accommodation for them.

   The report "Socio-economic study of the expected impacts of heap recycling in Chvaletice" is included as an annex to this documentation (Faculty of Science, Charles University Prague. 2021).

2. Municipality Řečany nad Labem, No. 460/2020 of 30.8.2020

The municipality of Řečany nad Labem, on the basis of the statement below and all the comments, takes a negative position towards the project "Recycling of the Chvaletice - Trnávka tailings". According to the statement, the biggest issues are the increase in noise pollution in the municipalities of Řečany nad Labem and Trnávka, non-compliance with air pollution limits due to mining and subsequent processing, drought and water issues, manganese emissions and hazardous waste management.

The municipality of Řečany nad Labem expressed the following requirements and comments on the project:

a) In the village of Řečany nad Labem, the noise conditions in the development were not measured at the current noise load. The implementation of the project will result in an increase in traffic in connection with the transport of materials and raw materials, especially rail traffic, but road transport. The municipality therefore requests that a noise study be carried out for the residential development directly adjacent to the railway station in the municipality.

For the purposes of the updated noise study, noise measurements from railway traffic were also carried out in Řečany nad Labem. The study also assesses the impact of traffic noise (road and rail) in this village.

b) In terms of passenger and freight transport, the acoustic study does not mention how the route for importing and exporting material to the plant will be determined and to the extraction site. According to the municipality, if the route were to run along the local road Řečany nad Labem - Trnávka, there would be a significant increase in car traffic, which would affect the quality of life of the inhabitants in the municipality.

The local road Řečany nad Labem will not be used for the needs of the project.

c) It is not clear from the study what kind of noise will be produced by the actual extraction from the tailings, which are cadastrally directly adjacent to the village of Řečany nad Labem. However, according to the municipality, it can be assumed that the mining itself will also have an impact on the noise conditions of the properties located in the municipality.

The noise study assesses the impact of mining and processing of the raw material on the built-up area in all surrounding villages. The noise level in Řečany nad Labem is evaluated in the noise study, both separately and in cumulative with noise from other stationary sources. The noise level from the mining operation itself in Řečany nad Labem will be around 30 dB during the day, which is completely insignificant in the context of the existing noise situation; the noise from the mining operation will not be identifiable by ear at all.

d) Meetings with the citizens of Řečany nad Labem show that they are concerned about the decline in the price of their properties in connection with mining.

The issue of real estate prices is not subject to environmental and public health impact assessment. However, it can be stated that none of the impacts of the project are assessed as adverse for the development of Řečany nad Labem. The project has been designed to minimise any adverse impacts on the significantly closer Trnávka village.

e) Within the framework of the noise protection measures related to the project, no soundproofing of the residential areas of Řečany nad Labem and Trnávka is envisaged, both of which will be burdened by traffic and the operation of the site during nighttime. Furthermore, if the use of the siding, including the loading and unloading of materials, were to take place during night-time quiet periods, the noise conditions in the village would not meet the noise standards. Furthermore, noise measurements in the municipality of Řečany nad Labem are not part of the acoustic study.

Noise measurements in Řečany nad Labem were carried out for the purpose of the EIA documentation.

The noise study does not show that the implementation of the project would result in an exceedance of the noise limit in Řečany nad Labem or Trnávka.

One of the proposed measures excludes the operation of the siding at night.

f) The municipality further notes that the assessed operation will be a source of emissions of particulate matter, sulphuric acid, ammonia, nitrogen oxide, benzene and benzo(a)pyrene. The emission limits will not be met for benzo(a)pyrene, sulphuric acid is not monitored, and no limit is currently set for ammonia. In addition, sulphuric acid will be transported by trains, where the municipality believes there will be a higher risk of pollutant releases. Ground limestone and powdered lime hydrate will, according to the municipality, increase dust from their use. Leaching and precipitation will generate tank waste gas which will escape into the air. The municipality also sees an additional risk from the gases generated by electrowinnig, which will escape directly into the atmosphere.

The dispersion study assesses the impact on air quality for all of these pollutants in a comprehensive manner. According to the current data from the Czech Hydrometeorological Office, no air pollution limits are exceeded in the area and the project will not cause any exceedance of these limits. Emission contributions from residential development will be low. For pollutants that do not have an air pollution limit, an updated public health impact assessment has been prepared. For pollutants that may be a source of odour perception, a comparison has been made with the olfactory thresholds, the modelled concentrations are well below these thresholds.

The technical design of the project has been carried out according to BAT (Best Available Technology) standards and emissions to air are minimised by a range of technical measures, both anti-dust and scrubbers.

In order to minimize dust from the actual mining and the remediation and reclamation, technical conditions of operation are proposed in accordance with the requirements of Decree No. 415/2012 Coll. and on the basis of the requirements of the Air Protection Department of the Ministry of the Environment.

With regard to the impact on air quality, it should be noted that in the context of further project preparation and permitting processes, the impact on air quality will also be subject to the procedure for issuing binding opinions pursuant to Section 11(2)(b) (for the determination of the mining operation and the zoning procedure), (c) (for the mining permit and the construction permit) and the decision on the operating permit pursuant to Section 11(2)(d) of Act No 201/2012 Coll, The air protection authority may take into account the current air quality situation and specify the requirements for the location, construction and operation of the air pollution source.

g) Since it is not clear when the slopes of the dump will be grassed over and seeded with trees, nor what type of trees will be used, the municipality believes that until then the dump will only be a large "hopper of living material", i.e. soil that will have to be delivered to the dump in order for trees to grow there. The municipality also draws attention to the issue of dust and increased traffic associated with the application of the liner as part of the reclamation of the spoil heap. According to the municipality, the dust will be caused both by the material itself and by the vehicles that will be bringing the material in. The municipality also perceives the spoil heap as the least favourable in terms of air impacts, mainly due to dust and transport requirements, which will increase traffic congestion on the site.

The surface of the reclaimed tailings will be grassed immediately after their closure with insulation and after the topsoil has been placed continuously and annually, thus leaving the surface with bare soil for a long time.

Although the risk of dust is higher in the case of stockpiles than in the case of the dust-free mass of the actual stockpiles with their high moisture content, the stockpiles will be transported from the site of their extraction directly to the site of their disposal, which will minimise the number of operations and ensure that they are handled in a naturally moist state.

Stripping will not take place on a long-term or year-round basis, averaging between 5 and 60 days per year (average 50). The days on which the stockpiling will be carried out should be chosen to be days with a low risk of excessive dust. Consequently, scraping will be carried out outside the dry and windy season.

The dust associated with the handling of the stockpiles is assessed in the dispersion study, including the handling of the stockpiles deposited in the external disposal site.

h) The municipality considers the consumption of 380 000 l of diesel per year for rail transport to be a significant negative environmental impact.

The specified average annual diesel consumption for the siding is 300 000 l. Diesel combustion in railway vehicles is included in the dispersion study and the impact on air quality in Řečany nad Labem (calculation points 11 and 12) is very low.

i) For the municipality of Řečany nad Labem, where both road and rail traffic will take place and the municipality will be affected by immissions, neither immission contributions nor secondary dust have been determined, which represents another shortcoming of the project for the municipality.

The dispersion study included points 11 and 12, which represent the residential development of the municipality of Řečany nad Labem.

j) There is no similar manganese extraction and processing in the European Union, so the reliability of the calculated air pollution concentrations by the dispersion model cannot be interpreted strictly. The climatic input data were processed during a period of severe drought and the situation has changed recently, so that even the selected average values of the individual variables are not reported over a sufficiently long period of time.

The fact that there is no similar way of extracting and processing the raw material does not mean that the emission factors are incorrectly chosen. The actual extraction and handling of spoil, raw material and mining waste is not untried or untested, it is a normal handling of material of the nature of soils or sediments.

The emissions associated with processing in the plant area are then derived from the process equipment used and the balance of materials and emission minimisation measures applied. From this point of view, the processing technology used produces very low emissions of pollutants, whether organic or inorganic gases or solids (dust).

The wind rose as the basic basis for the dispersion study was purchased from the Czech National Hydrological Office (CNMI) for the site and is a standard and relevant basis. None of the meteorological or climatological data used relate to periods of severe drought.

k) The municipality contradicts the conclusion of the study from the dendrological survey of the site, which states that the project does not substantially interfere with any of the adjacent biological elements protected by the law and does not substantially affect the elements located in the neighborhood. According to the municipality, this conclusion is completely inconsistent with the red-listed invertebrate species found. The dendrological study states that the indirect effect will be increased dust, noise and disturbance from the permanent human presence during construction, which cannot be tolerated by the municipality.

The dendrological survey concerns only tree species and is submitted in an updated form as an inventory of the affected tree species.

Regarding the impact on specially protected or rare species, including invertebrates, this is assessed in the biological assessment, updated in 2022. Although a number of rare and specially protected species have been found on the site, the impact on these is assessed as adverse but acceptable. Gradual stripping and concurrent remediation and reclamation will enable the conservation of plant and animal species on the site. The extraction and disposal of very wet material is not a significant problem in terms of dust. Only excavators and trucks will be noisy, and the material will not be crushed, screened or treated in the tailings area. It is clear from experience at dozens of sites in the Czech Republic that a number of rare and specially protected species are found in close proximity to the quarries or right on their edges, even at operations where significantly more noisy machinery is concentrated in a small area, such as quarries.

To conserve rare invertebrate species, areas of non-humid substrate without planting and seeding of vegetation have been designed as part of the reclamation.

l) It is not clear from the study which variant of landfill insulation will be used (whether clay insulation or plastic sheeting).

Only the foil solution is proposed.

m) In the municipality's judgment, the intention is not to remove the environmental burden for the reason that only manganese will be subsequently extracted from the material to be removed and the rest of the dead material will be returned to the site. The municipality further submits that unless the company is clear on how to effectively prevent further leaching for several years ahead of time of substances that may continue to be present in the returned material after the chemical process, this is not the removal of an environmental burden.

The post-treatment material, characterised as mining waste, will be securely disposed of in isolated spoil heaps. This will isolate it from the surrounding environment. From this point of view, this is a significantly more environmentally favorable situation compared to the current scenario. It effectively prevents the spread of pollutants from the tailings area to surface and groundwater.

n) If sowing with trees is considered, as the conclusions of the working meeting of the group for remediation and reclamation state, then it will be necessary to bring about 800,000 m3 of soil to the heaps for the top layer, and about 200,000 m3 of aggregate underneath for the purpose of seepage. Delivering the material to the site will not only cause increased movement of heavy trucks, increased dust and noise. Even the local roads are not designed for such a permanent load and are already in a worse condition. At the same time, a sufficient layer of soil must be brought in, depending on the type of cultivars being grown, to prevent them from dying in the dry months and also to prevent them from tearing through the root system of any foil chosen. The specific species and details have not yet been determined.

Both the top layer and the subsoil will be made of the spoil from the tailings dump itself (the average thickness for tailings dumps 1 and 2 is approx. 1.5 m, for tailings dump 3 it is 0.95 m). These materials will be supplemented with material from the construction of the processing plant (mainly excavated soils from the landscaping, and certified recycled construction material from demolition sites for the subsoil). This will be a sufficient amount of material, therefore no significant amount of external soil transport is envisaged.

o) The municipality of Řečany nad Labem is reasonably concerned about the height of the spoil heaps, where the expected height is 25 m. The mining area has been classified as a World Heritage Site buffer zone by UNESCO and could cause significant disturbance to the landscape.

The assessment of the impact on landscape character shows an insignificant impact. This is also due to the fact that the overall height of the spoil heaps will not be increased compared to the present.

p) The municipality states in its submission that it has been repeatedly told at the company's meetings with citizens that the extraction and subsequent removal of the environmental burden is necessary because of the contamination of the wells. However, the results of the analyses of the samples from the boreholes did not show any groundwater contamination. The tailings do not affect groundwater quality in the domestic wells in Trnávka and Telčice, and the extraction of manganese will not improve the quality of the water in the wells.

Manganese contamination of groundwater is evident from annual groundwater monitoring, the results of which are summarised in the Water Impact Assessment (Annex 4). Groundwater samples from the tailings area and its immediate surroundings show a significant increase in the concentrations of some indicators, especially manganese (Mn concentrations in the tens to first hundreds of mg/l, max. 997 mg/l), sulphates, iron, aluminium, ammonium ions and in some cases also chromium, lead and zinc. However, this report also mentions the fact that manganese concentrations in domestic well water are significantly lower. The tailings do not directly affect the groundwater quality of these properties because they are located upstream of the groundwater flow. However, the removal of manganese and the provision of a disposal site for mining waste will clearly reduce the potential for manganese to be released into the environment.

q) Due to the drought, the municipality considers it necessary to carry out a passportisation of the existing hydrological and hydrogeological objects and to determine the ecological risks in the cadastral territory of the surrounding municipalities, in particular the municipalities of Trnávka, Řečany nad Labem, Kladruby nad Labem, Selmice and Labské Chrčice, which are on the groundwater flow route and are not included in the study.

Compared to the documentation submitted to the discovery procedure, there has been a significant change. No groundwater will be pumped for the project. Therefore, the project does not affect the groundwater level and the impact on the groundwater level and groundwater resources is practically zero in this respect.

However, annual groundwater monitoring is ongoing and is expected to continue throughout the lifetime of the project.

r) Manganese emissions will be generated in the tailings area and any dispersion of emissions may affect the health of people and animals in the vicinity. The local environment is already burdened by the Chvaletice Power Plant, the foundry and the packing plant, which operate right next to each other. However, Mangan Chvaletice s.r.o. does not take into account in its studies the burden on the existing foundry and packaging plant, which were built here only in the last two years, when Mangan Chvaletice s.r.o. was making its studies and therefore did not include them in its analyses. The absence of these two enterprises in the overall assessment may therefore mean that both noise and other emission conditions in the affected area and the surrounding area are exceeded. The municipality therefore considers that the studies should take these undertakings into account.

Manganese emissions were calculated separately in the dispersion study and were taken into account in the public health impact assessment. The specific air pollutants produced by the project, which include manganese, were evaluated by screening risk characterisation by comparing reference exposure limits, reference concentrations and exposure dose limits set by world scientific institutions, with WHO as the preferred choice. The results of this assessment do not indicate any potential for adverse effects on public health; the contributions of these pollutants are quite insignificant and well below the reference values.

The background emission inventory prepared annually by CHMU already includes the impact of existing sources of air pollution. In the case of the aforementioned packaging plant and foundry, the impact of these plants has also been taken into account in the dispersion study and the results are thus assessed in cumulative terms.

s) Residents of the village are concerned about the consequences of the increase in dust particle immission concentrations associated with the commencement of mining, which will alter air quality and may cause respiratory symptoms in children. The results of the calculations in the submitted dossier are subject to considerable uncertainty due to uncertainties in the calculation baselines and should only be regarded as an educated guess. Manganese mining of this kind does not exist in Europe, and it is therefore likely that it cannot be said with certainty that the estimated impacts will not be at a higher level than considered here.

The updated dispersion study was prepared for all potential pollutants according to standard methodology using relevant emission factors. Uncertainties in the calculation are thus minimised.

See response to point (f) for further details.

t) The municipality points out that the study does not address the disposal of hazardous waste, which is a significant component and will be a burden on the environment. The production process will generate wastewater which cannot be discharged into a watercourse without treatment. We do not yet know how the wastewater will be treated, how it will be treated and how much of the treated wastewater will be discharged back into the watercourse, probably the Elbe River.

Solid waste and wastewater issues are addressed in detail in the EIA documentation. Waste will be transferred to a recovery or disposal facility outside the area of interest.

The wastewater will be treated in a standard way and subsequently discharged into the Elbe River under conditions specified by the water authority and the river manager and controlled by the relevant state authorities.

u) The area of interest is currently being hunted, as the environment is wooded and thus creates a natural habitat for the game found there. Interference in the area will be a major interference with the natural life of these animals.

After the establishment of the mining area on the exclusive deposit of manganese ore and the authorisation of mining activities on this deposit, the possibility of this recreational activity will be limited. As regards the presence of wildlife, there will be no major restrictions on its occurrence. According to the experience from other mined sites, wildlife may continue to use hitherto untouched parts of the site, or it may gradually return to the already reclaimed area. In the case of game, these are not species that are subject to special protection under Act No 114/1992 Coll.

3. *Regional Authority of the Pardubice Region, Department of Environment and Agriculture, ref. KrÚ 58235/2020/OŽPZ/JI of 1.9.2020*

- ***Statement of the water management authority***

  The Regional Authority has no objections to the submitted plan from the point of view of the protection of water management interests relevant to the Regional Authority of the Pardubice Region. The Regional Authority points out that the area of interest of the proposed Trnávka mining area is located in the immediate vicinity of the territory in which the Flood Risk Management Plan defines a medium or high flood risk.

  The issue of floods is taken into account in the EIA documentation in the part concerning risks and non-standard conditions. In the next stages of preparation, the preparation of a flood plan is expected.

- ***Statement of the nature conservation authority***

  From the point of view of the interests entrusted by Act No. 114/1992 Coll., on Nature and Landscape Protection, as amended (hereinafter referred to as the "Nature Protection Act"), to the competence of the Regional Authority of the Pardubice Region, the Nature Conservation Authority (hereinafter referred to as the "OOP"), i.e. the territorial system of ecological stability (regional and supra-regional level), nature parks, specially protected areas (nature reserves and monuments), sites of Community importance, bird areas and specially protected species of flora and fauna, there are no fundamental comments on the submitted Notification: the OOP considers the extent to which the notification was processed to be sufficient from the point of view of the competences entrusted to it by law.

  No comments.

- ***Statement of the waste management authority***

  From the point of view of the interests entrusted to the competence of the Regional Authority of the Pardubice Region, the waste management authority, Act No. 185/2001 Coll., on Waste and on Amendments to Certain Other Acts, as amended (hereinafter referred to as the "Waste Act"), there are no objections to the submitted plan. The Regional Authority points out that the issuance of a binding statement on the location of the building, on the change of land use, on the building permit and on proceedings pursuant to a special legal regulation - Act No. 183/2006 Coll., on Spatial Planning and Building Rules (Building Act) in terms of waste management is in accordance with the provisions of Section 79 par. 4 of the Waste Act, only the competent municipal authority of the municipality with extended competence is competent.

No comments, no reminders of legal requirements.

- ***Statement of the Major Accident Prevention Authority***

If the quantity of hazardous chemical substances or chemical mixtures exceeds in total the amount of substances placed in the premises equal to or greater than that specified in Annex 1 to Act No. 224/2015 Coll., on the prevention of major accidents caused by selected hazardous chemical substances or chemical mixtures and amending Act No. 634/2004 Coll., on administrative fees, as amended, (the Major Accident Prevention Act), as amended, then the provisions for new facilities that are specified in Title V of this Act, i.e. to process pursuant to Section 5 par. 1 and 2 of this Act, a proposal for classification in group A or group B and a major accident risk assessment. If it is found that the object (defined according to § 2 of the Act) is not subject to inclusion in any of the groups, a protocol on its non-classification with calculations for the maximum amount of dangerous substances that will be located in the above-mentioned object will be prepared in accordance with the provisions of Section 4 of the Act on the Prevention of Major Accidents, as well as for its possible inclusion in one of the groups in terms of domino effect (Section 7 of the Act). At present, there is no object classified in group A or group B according to Act No. 224/2015 Coll., on the prevention of major accidents, in the area of interest or its surroundings. The administrative authority points out that the documents for the proposal for the inclusion of the building and the assessment of the risks of a major accident, or a protocol for its non-inclusion, must be submitted to the regional authority simultaneously with the submission of the application to the building authority for a zoning decision on the location of a new building, or applications for a building permit, if a zoning decision is not issued.

No comments, no reminders of legal requirements.

- ***Statement of the body of integrated prevention***

The facility is subject to Act No. 76/2002 Coll., on Integrated Pollution Prevention and Control, on the Integrated Pollution Register and on Amendments to Some Acts (Integrated Prevention Act), as amended (hereinafter referred to as the Integrated Prevention Act). The facility will carry out industrial activities listed in Annex 1 to the Act on Integrated Prevention. Specifically, point 2.5. 'Processing of non-ferrous metals: (a) the production of non-ferrous raw metals from ore, concentrates or secondary raw materials by metallurgical, chemical or electrolytic processes'. The operator is obliged to submit an application for an integrated permit to the authority. The requirements of the application are governed by Annex 1 to Decree No. 288/2013 Coll., on the Implementation of Certain Provisions of the Act on Integrated Prevention. We recommend consulting the final form and scope of the application at the Department of Environment and Agriculture of the Regional Authority, Department of Integrated Prevention, before its official submission. The Office first states that the rights and obligations arising from the building permit or joint permit by which the building is located and permitted, issued under special legal regulations may be exercised no earlier than from the date of legal force of the integrated permit.

No comments, no reminders of legal requirements. The EIA dossier contains in Chapter B.I.6 mandatory comparison with the requirements of BAT, BREF.

4. ***Municipal Office of Přelouč, Department of the Environment (municipal authority with extended competence), ref. MUPC/14816/2020/OŽP/KH of 2.9.2020***

- ***In terms of Act No. 114/1992 Coll., on Nature and Landscape Protection:***

  Assessment of the impact on the landscape character - Plant of secondary treatment within the recycling of the tailings Chvaletice-Trnávka - outlook point A4 location: Trnávka - parking at the wastewater treatment plant - incorrect photo shown, the current state is 2x, the proposal of the state after implementation is not stated.

  The relevant assessment was reworked, including visualizations according to the modified technical solution of the project.

- ***From the point of view of Act No. 201/2012 Coll., on Air Protection and on Amendments to Some Other Acts:***

  To minimize dust from the anticipated activity by available means, e.g. to proceed in accordance with the Methodological Instruction of the Air Protection Department of the Ministry of the Environment of the Czech Republic on Determining Conditions for Limiting Emissions from Construction Machinery and Other Construction Activities – September 2019.

  Request accepted. The measures to minimize the effects within the construction phase include the requirement to include the conditions from the cited methodological instruction in the documentation for follow-up proceedings, specifically the building permit procedure.

- ***From the point of view of Act No. 334/1992 Coll., on the Protection of Agricultural Land Fund:***

  No comments.

  No comments.

- ***From the point of view of Act No. 289/1995 Coll., on Forests and on the Amendment of Certain Acts (Forest Act):***

  No comments.

  No comments.

- ***From the point of view of Act No. 185/2001 Coll., on waste and amending certain other acts:***

  From the point of view of waste management, there are no comments on the assessed project at the given stage of preparation. Waste management is dealt with in the PD in section B.3.3.

  No comments.

- ***Opinion in terms of Act No. 183/2006 Coll., on Spatial Planning and Building Regulations (Building Act):***

  The assessed plan is not in accordance with the Zoning Plan of the municipality of Trnávka, which is effective from 23.11.2005 including amendment No. 1 effective from 13.5.2010.
  The assessed project is not in accordance with the zoning plan of the town of Chvaletice, including amendment No. 2, which is effective from 20.11.2013.

The information was sent to Mangan Chvaletice in the form of a statement of intent in terms of land-use planning documentation on 15.4.2020, which our Spatial Planning Office issued under the reference number MUPC 7695/2020.

For land-use planning issues, see Part H of the documentation.

- ***Opinion in terms of Act No. 13/1997 Coll., on roads:***

  No comments.

  No comments.

- ***Opinion in terms of Act No. 254/2001 Coll., on Water and on the Amendment of Some Acts (Water Act), as amended, and Act No. 274/2001 Coll., on Water Supply and Sewerage for Public Use and on the Amendment of Some Acts (Water Supply and Sewerage Act):***

  No comments.

  No comments.

5. Regional Hygiene Station of the Pardubice Region with its registered office in Pardubice, ref. KHSPA 15114/2020/HOK-Pce of 2.9.2020

The Regional Hygiene Station (KHS) of the Pardubice Region, after evaluating the submitted notification with the requirements in the field of public health protection, considers the scope of the notification to be insufficient and requires the notification to be completed and the acoustic study to be completed.

The KVC makes the following comments on the notification:

a) Chapter B.2.6 Requirements for transport and other infrastructure does not specify in the notification a clear transport balance related to the operation of mining and the operation of the processing plant – numbers (movements) of TNA, LNA, OA per day, including operating hours and the breakdown (routing) of this transport balance to individual roads in the vicinity of the project (i.e. No. II/322, No. I/2, etc.).

   Transport and acoustic issues are completely reworked and updated in this documentation, the transport balance is presented in a separate study (SUDOP, 06/22).

b) Furthermore, the notification does not specify the cumulative transport balance for the whole project, i.e. the mining and processing plant combined. This same transport balance should also be reported in other studies, i.e. in the acoustic study and in the dispersion study, which are based on the transport balance for their further calculations.

   Transport and acoustic issues are completely reworked and updated in this documentation, the transport balance is presented in a separate study (SUDOP, 06/22). Traffic engineering documents include cumulatively all transport claims.

KHS also provides comments on the acoustic study:

a) The text of the noise study will include a clear transport balance related to the operation of mining and the operation of the processing plant – the number (movements) of TNA, LNA, OA per day, including the operating hours and the distribution of the number (movements) of TNA, LNA, OA to individual roads in the vicinity of the project (i.e. No. II/322, No. I/2, etc.). Also include cumulative transport balances for the entire project, i.e. mining and processing plant together. The acoustic study should clearly show what numbers (movements) of TNA, LNA, OA were entered into the individual solved communication sections in the model.

The original AS (Králíček, 2020) was based on the following document: "Study of the road connection of the project "Recycling of the tailings Chvaletice-Trnávka" from 11/2019 addressing the induced traffic of the project and the intensity of car traffic on the communication network in the area. Table 3.2.3C (page 33) shows the intensity of induced car traffic related to the "PLANT" and "MINING" parts of the project, as well as the induced rail transport. The traffic caused will be burdened mainly by road II/322, to which the project is connected to traffic. On page 39 of the AS Table 6-1A shows the complete monitored communication network for all variants of the calculation, always a comparison for the sections of roads BEZ and SE intention. A similar table 6-1B is on p. 41 for rail transport.

Based on this, a detailed update of the road connection study (Melzer et al., 2022) was prepared, see Annex 9 (of this EIA documentation), which provides cartograms of the unraveling of induced traffic and traffic load for individual phases of the calculation.

b) To add on which RMD (Directorate of Roads and Motorways) census the model calculations of 2019, 2023, 2040 are based and what conversions for these individual years were used.

The acoustic study for the purposes of the notification of the intention was based on the document Study of the Road Connection of the Project "Recycling of the Chvaletice-Trnávka Tailings" from 11/2019, as well as on the census carried out within the noise measurement and on the available data of the RMD for 2016 (https://www.rsd.cz/wps/portal/web/Silnice-a-dalnice/Scitani-dopravy).

The traffic intensities for the individual years of calculation were, if the intensity was not known, recalculated according to the coefficients from TP 219.

At this stage of the EIA documentation, a detailed traffic study is prepared (Annex No. 9 of this documentation) or see Table 6-1A Acoustic studies (Annex No. 1 of this documentation).

c) In the acoustic study, hygienic limits are incorrectly determined, which grant correction for the old noise load in the case of rail transport (when determining the old noise load correction, the limit contour 2000 is used, both for the day and night period).

In the AS for Notices in section 4. Hygienic noise limits are given according to Government Regulation No. 272/2011 Coll. a complete analysis of hygienic limits. Determination of hyg. limits correspond to the current legislation. Similarly, in this AS for EIA documentation, hygiene limits are specified in section 4.

d) Calculations of the noise level of the total noise in the area (traffic on public roads + sources in the areas in the area, including the project site) do not have set hygienic limits with which these calculated noise values could be compared.

According to Government Regulation No. 272/2011 Coll. (Document No. 1 AS), the total noise, which consists of noises from individual partial sources (road transport *on main roads, road transport on secondary roads, train transport, sources in individual areas), does not have hygienic noise limits.*

According to the said regulation, hyg. Limits on individual sources – see Section 4. Hygienic limits. In the chapters in the AS for Notification 6.6.4 to 6.6.7., the individual noise sources are analyzed and evaluated according to the respective hygs. Limits.

As part of the acoustic study for the EIA documentation (2022), the analysis of the actual noise of the Project Site begins, see Chapter 6.6.3., followed by concurrence with other areas – Chapter 6.6.4., then Car Transport 6.6.5., Railway Transport 6.6.6. and subsequently for information on the total noise 6.6.7.

e) Model calculations from road transport, railway transport, stationary noise sources are made for 54 calculation points, where it is not clearly stated which calculation points and their nearest CHVPS (facades of buildings) correspond to individual noise sources. The relevant calculation points should be selected separately for rail transport, separately for road transport and separately for stationary sources, indicating always the relevant façade of the building facing the source of the assessed noise. For the calculation points, for clarity, state the specified hygienic limits (hygienic limits need not be set only for roads of first and second classes 60 dB/50 dB, but also 60 dB/60 dB or 70 dB/50 dB, etc.)

In the AS for the Notification, the individual monitored points were selected so as to characterize as much as possible the individual areas with protected buildings in terms of possible noise influence from the project. In the noise assessment at individual points for the years of calculation (always listed below the tables of noise level values), hygiene limits are always set – see section in the AS for Notifications:

- 6.6.3. Results of the calculation of TOTAL noise in the area (traffic on public roads + sources in the areas of the project, including the project site), comparison of the state with and without the intention (page 83 AS).

- 6.6.4. Results of noise calculation only from RAIL transport on the public communication network (page 96).

- 6.6.5. Results of noise calculation only from CAR traffic on the public road network (page 102).

- 6.6.6. Results of noise calculation only from CLOSED AREAS IN THE AREA including the assessed project (page 108).

- 6.6.7. Results of noise calculation only from the AREA of the project Recycling of the Chvaletice-Trnávka tailings (page 114).

Noise assessment from individual sources is also carried out in the AS for EIA documentation (see Annex No. 1 of this documentation), but with the opposite order, i.e. it starts with the actual area of Chapter 6.6.3.

f) For calculation points in Chvaletice, for the calculation of road traffic noise, select the calculation points, i.e. the nearest CHVPS and their corresponding facades to the existing road No. II/322 and then the calculation points, i.e. the nearest CHVPS and their corresponding facades to V Telčice and Kolínská streets (the original line of road No. II/322). The correct selection of the nearest CHVPS is important for the correct determination of hygienic limits and for the correct evaluation of whether the stated noise control measures (PHO) are necessary in the acoustic study. It is a designed acoustic screen along the southern edge of road no. 322, which follows the existing screen at the road and continues west to the intersection with V Telčice street. The screen is 476 m in total length, 3 m above the surface of road no. 322. The screen must be installed along the roadside at a distance of up to 1 m. The structure of the screen must have sound insulation at the level of min Rw = 25 dB, the surface of the acoustic screen can be reflective (i.e. glass). In addition, indicate the noise values before and after PHO.

In the AS for Notification (2020), the individual monitored points were selected to characterize as much as possible the individual areas with protected buildings in terms of possible noise influence from the project.

In the AS for EIA documentation (2022, Annex 1 to this documentation), the calculation points have been extended by 2. Results in automobile transport are given with the required distribution before PHO and after, see Tables 6.6.5A and 6.6.5B of the acoustic study in the Annex.

g) For example, for the calculation of road traffic noise in Chvaletice, VB 1 was chosen – with registration number 385 with the statement that it is not a residential building, so why was it evaluated? However, the closer CHVPS to road no. II/322 was not evaluated as e.g. a residential building in Telčice no. 2, Chvaletice.

Monitored point 1 – Chvaletice reg. no. 385 was chosen because of its proximity to road II/322 (it will be burdened by the traffic caused by the project) and also because of the proximity of the mining area – part of the "MINING" project. This building is only partially overshadowed by the existing concrete screen. In addition, it is an object where you can live, even if it only has a registration number.

The building in Telčice No. 2 has a barn in the direction of road II/322 (the building is turned by the residential part to the road in V Telčice Street, which will not be burdened by the traffic caused by the project) and the building is shielded to the mining area and to the II/322 barn and also by the existing screen.

The points in the AS for the EIA documentation correspond to a similar scope of the area but are extended by 2 more. At the same time, the measuring point MB_1 changed its position in the protocol for the EIA documentation (after discussion with the KHS) and is located in 4.NP in front of the northern façade of the Obránců míru 145 Chvaletice apartment building, compared to the original location of Chvaletice reg. 385.

The calculation points do not necessarily have to characterize only the most protected place, sometimes it is appropriate to include an informative point of the calculation to know what is happening in the given location for each variant of the calculation.

h) In order to correctly determine the hygienic limits, a document on the current classification of street V Telčicích and Kolínská Street will be submitted.

Urban and regional bus transport runs through the roads, so the roads are treated as 2nd class roads.

i) In the area of Trnávka, Chvaletice, indicate whether the existing noise barrier is included in the model and in which variants of calculation.

Comment of the author of the Noise study: Trnávka:

- *2000: Missing existing PHO for the railway (see page 94 of the AS for Notifications).*
- *2019 and beyond: PHO is.*

Chvaletice:

- *2000: The bypass north of Chvaletice is missing, i.e. car traffic runs along V Telčice Street, thus the existing PHO is missing (see page 91 of the AS for Announcements).*
- *2019 and onwards: Is bypass + existing PHO.*

Everything is described in detail in the Notification AS in chapter 6.6.1 Basic assumptions of acoustics. modifications and 6.6.2. Variants of noise calculation, where it is clearly defined what was and was not considered in terms of screens, location of roads, modifications of traffic, etc. Everything is described in the same way in the AS for EIA documentation.

j) Add isophon maps for individual noise sources separately – rail transport, road transport, stationary sources to the annexes.

AS contains noise zones for total noise for day and night, as well as 3D views of noise zones from sources only in areas for the 8 noisiest hours of the day and for the noisiest 1h at night.

Of course, the required isophone maps for individual sources can be supplemented – the outputs are in the archive of AKUSTROJEKT s.r.o., but the complexity of AS will be further increased. The aim of the AS is to prove under what conditions (acoustic modifications) the project will be in terms of noise in accordance with current legislation and the required graphic outputs of individual noise sources are not absolutely necessary. Another reason is that a relatively dense network of monitoring points was chosen, in which the noise contributions of individual sub-sources are determined.

In the AS for EIA documentation, situations with noise zones are specified for each calculation variant of the project area, Car transport and Railway transport, see Graphic annexes to the acoustic study.

k) The correction for the old noise load is made incorrectly in the acoustic study, when the year 2000 and 2019 without the intention are compared, the year 2000 is correctly compared with the prospective year with the intention.

The determination of the SHZ (old noise pollution) was made in the AS for the Notification from the difference in noise values of 2019 without the intention MINUS 2000 and, of course, also checked on the difference: prospective year with the intention MINUS 2000. It is carried out in the same way in the acoustic study for the EIA documentation.

l) In the assessed locality, the hygienic limit is already exceeded at night from the operation of the Chvaletice power plant, which is gradually implementing noise control measures according to the schedule, which gradually lead to compliance with the hygienic limit. The contribution of the assessed project must not predict the deterioration of hygienic limits of 50 dB during the day and 40 dB at nighttime in the nearest CHVPS of the surrounding municipalities.

Section 8.2. of the AS for the Notification "Requirements for acoustic modifications within the commissioning of the project site" (pages 140 and 141) provides an analysis of modifications on the Chvaletice power plant site:

- *By the end of 2022, it is necessary to implement noise control measures on the premises of the Chvaletice power plant.*
- *These measures are in accordance with the opinion of the KVC No. KHSPA 21020/2017/HOK-Pce and No. HKSPA 21040/2017/HOK-Pce, see document /8a/ of this AS of 6.12.2017, and further with the decision and integrated permit of the Pardubice Environmental Protection Authority, document no. SpKrÚ 19451/2019/OŽPZ/CH of 18.4.2019, see document /8b/ AS for the Notification (specifically page 19 in the document).*
- *The acoustic modifications concern the dominant noise sources on the premises of the Chvaletice Power Plant, these are the following modifications listed in stages 3b and 4a – 4d according to the document /8a and 8b/ (these are the above-mentioned documents):*
    - *Stage no. 3b = Installation of new noise enclosures on outlet transformers T1 and T2 with a reduction of sound pressure level at the noise source by 20 dB on each transformer.*
    - *Stage 4a = Reduction of noise emitted from the façade of the engine room of the turbine hall TG with a reduction of the sound pressure level at the source by 20 dB.*
    - *Stage 4b = Reduction of noise emitted from the skylights of the engine room of the TG turbine hall with a reduction of the sound pressure level at the source by 20 dB.*
    - *Stage 4c = Reduction of noise emitted from the façade of internal coaling with a reduction of the sound pressure level at the source by 10 dB.*
    - *Stage No. 4d = Implementation of noise modifications of the exhaust on the roof of the engine room of the turbine hall TG with a reduction of the sound pressure level by noise sources by 15 dB.*

In the AS for EIA documentation, the modifications of the ECH are specified by a new document "Noise assessment at the reference point of the MB_X in Trnávka from the premises of Elektrárna Chvaletice, a.s., design of acoustic modifications".

6. *Czech Environmental Inspectorate, Regional Inspectorate Hradec Králové, ref. ČIŽP/45/2020/6007 of 13.8.2020*

- ***Department of Air Protection***

  The Czech Environmental Inspectorate, Department of Air Protection, has no comments on the submitted plan.

  No comments.

- ***Department of Water Protection***

  The Czech Environmental Inspectorate, Department of Air Protection, has no comments on the submitted plan.

  No comments.

- ***Department of Waste Management***

The Czech Environmental Inspectorate, Department of Waste Management, points out that construction products that have been used in construction do not become waste only if they are removed from the building and subsequently used at the construction site or on another construction site again as construction products for their original purpose (e.g. cleaned bricks, panels, beams, gravel, sand), because they do not meet the definition of waste set out in Section 3 of Act No. 185/2001 Coll., on waste and on amendments to certain acts, as amended (hereinafter also referred to as the "Waste Act").

Waste from demolitions and earthworks will be handled in accordance with current waste legislation, i.e. Act No. 541/2020 Coll., on Waste and its implementing regulations. This material will be crushed and sorted into a form that will be used for remediation and reclamation of the space, at the same time its sampling will be carried out and compliance with the requirements for use for backfilling according to Decree No. 273/2021 Coll., on the details of waste management, will be verified. At the time of processing the documentation, a decree pursuant to § 8 par. 2) a law that will regulate the criteria for assessing compliance with the conditions for a by-product. Therefore, it cannot be reliably determined whether demolition and earth-work material obtained on the construction site of the processing plant will be classified as waste or as a by-product. If it is waste, it will be necessary to obtain a permit for the operation of a waste recovery facility in the reclamation area pursuant to Section 21 of the Waste Act. However, in terms of implementation technology as well as in terms of granulometry and quality of the materials used, the requirements will be identical in both cases. The management of materials and waste from construction activities is therefore assessed by this documentation. Waste from construction activities that will not be used for remediation and reclamation of the tailings will be classified by its originator (i.e. probably the implementing construction company) and will be handled in a lawful manner. They will be handed over for disposal or use to waste management facilities outside the project site.

In conclusion, the Czech Environmental Inspectorate, Department of Waste Management, draws attention to the fact that in order for waste not to become waste, but a by-product, it is necessary to meet the conditions of Section 3 par. Article 5(a) a) – e) of the Waste Act cumulatively. The Czech Environmental Inspectorate, Department of Waste Management, has no further comments on the submitted plan.

By analogy with the quoted provision from the no longer valid Act No. 185/2001 Coll., the issue of by-product is addressed in the new Waste Act in Section 8. For more details on the by-product, see the previous point.

- ***Department of Nature Conservation***

The Czech Environmental Inspectorate, Department of Nature Conservation, has no comments on the submitted plan.

No comments.

Department of Forest Protection

Land designated to fulfil the forest function and the forest stands growing on it will not be affected or damaged in any way by the construction and production activities of the investment plan.

The project does not encroach on PUPFL (land intended to fulfil the function of a forest) land or on land within 50 m of PUPFL land.

7. *District Mining Authority for the Hradec Králové and Pardubice Regions, ref. SBS 29721/2020/OBÚ-09/1 of 17.8.2020*

The Regional Authority in Hradec Králové has several comments on the submitted documentation of the environmental impacts of the project:

a) On page No. 22/288 the names of individual companies are incorrectly stated, such as GRANITA s.r.o., KAMENOLOMY ČR s.r.o., ZAPA beton a.s., Pavliš and Hartmann, spol. s r.o., etc.

The names have been corrected.

b) On pages No. 23/288 to 25/288 (Table No. 3) the land (type) is listed as a mining area – it is not registered on any of the listed plots with the local authority, this fact does not correspond to the current data in the CN register.

Fixed, the list of plots no longer contains any plot of the type of mining area.

c) On page No. 40/288 and in Picture No. 16 on page No. 49/288 there is a slope of individual mining cuts of 45o The OBÚ (Mining Authority) recommends determining the slope of individual cuts by the mining designer according to the mechanical properties of the raw material and according to the parameters of the proposed mining machines.

The design of mining parameters is based on a mining study prepared by an authorized mining designer. As part of the POPD (Opening, preparation and mining plan) processing, the technical parameters will be further specified, again by the mining designer according to the mechanical properties of the raw material and according to the parameters of the proposed mining machines.

d) On page No. 92/288 in Table No. 16 there is probably an error in the indicated shift THP (technical-economic employee) (2nd and 3rd inning). E.g. the provisions of § 7 para. 1 point. a) Decree No. 51/1989 Coll., as amended, sets the frequency of inspections to the shift technician at least 1x per shift.

The figures have been adjusted. As part of the mining part, a shift technician, i.e. a THP worker, will be present in the afternoon shift. There will be no 3rd (night) shift in mining.

8. *Ministry of Culture, Department of Monument Care, Department of Regeneration of Cultural Monuments and Heritage Protected Areas, ref. MK 52517/2020 OPP of 31.8.2019*

In its statement, the Ministry of Culture states that the project "Recycling of the Chvaletice-Trnávka tailings", as defined, may have a significant impact on the environment and states the following requirements:

a) To take into account the interests of state monument care and to set up compliance with the interest in the protection of cultural-historical values.

The interests of state monument care will not be endangered by the proposed plan; The present cultural and historical values will not be affected in any way as a result of the extraction of the deposit, the reclamation works or the construction of the processing plant.

b) The proposed plan must take into account the sustainability of historical compositional solutions, the specifics of management and the historical context that are subject to protection under the Heritage Act in heritage protected localities and cultural landscapes. In addition, proceedings are currently underway to declare a protective zone for the Stud Farm in Kladruby nad Labem for the area south of the Elbe River, which also includes the tailings in question. For this protection zone, 2 specific conditions for future possible building plans were proposed by the relevant monument care authorities. There is also a direct context with important heritage areas, such as the landscape conservation area of Kladrubské Polabí rej. No. USKP 2491, National Cultural Monument Kladruby nad Labem rej. No. USKP 272–16212/6-2096 and especially the UNESCO World Heritage Site Landscape for breeding and training of ceremonial carriage horses in Kladruby nad Labem reg. no. USKP 13 and its buffer zone no. USKP 7013.

The proposed plan does not directly interfere with any listed localities or cause a change in their impact within the surrounding landscape.

The protective zone of the Stud Farm National Park in Kladruby nad Labem was defined by the decision of the Municipal Office of Přelouč, Building Department on 25.8.2020. In the protection zone, emphasis is placed on preserving visual and compositional relations to the urban and landscape values of the mentioned national cultural monument, in particular:

- *Preservation of the current silhouette and panorama*
- *preservation of basic characteristic views of the National Heritage Site*
- *preservation and regulation of the height of the surrounding buildings, which would limit the visual links to the National Heritage Site*
- *maintaining suitable functions of use and rehabilitation of inappropriately used areas*

The above requirements were respected during the design work on the project. The only buildings located in the buffer zone will be covered by their own tailings from the northern views. However, in accordance with the condition set out in the said decision, it will be necessary to obtain a binding opinion pursuant to § 14 para. 2 of Act No. 20/1987 Coll., on State Monument Care, as amended. This binding opinion will be requested within the zoning procedure for the location of buildings and the procedure for the permission of mining activities. This is a legal obligation.

The potential of joint application of the proposed plan and compositional landscaping in the National Heritage Stud Farm near Kladruby nad Labem can be assumed:

1) *in views from higher altitudes on the slopes of the Iron Mountains (higher above the projected processing plant) – typically Chvaletická vyhlídka; in long-distance views to the north to the vast plains of the Elbe, the Stud Farm area is part of a wide landscape scene, in which the existing forest and non-forest greenery forms a visually compact component – compositional landscaping is not visually perceptible or recognizable in long-distance views; Potential shading – Limiting the view to the north as a result of the construction of a processing plant will not mean a reduction in their impact or expression in the landscape image.*

2) *in the view from the Vodárenská vyhlídka, respectively. Water towers in the area of the stud farm in Kladruby nad Labem. In the view from the top of the*

tower, the higher operational objects of the processing plant will be used to a limited extent; The processing plant is situated in the immediate vicinity of the Chvaletice power plant, whose main objects – cooling towers and chimney – achieve a strong visual expression in the landscape scene. In the view from the Vodárenská vyhlídka, the manifestation of the processing plant will be significantly weakened next to the existing dominants of the cooling towers and the power plant chimney, these high-rise buildings will continue to form quite significantly dominant architectural (industrial) elements of the landscape scene.

The planned mining in the proposed Trnávka DP will not be visible from the Vodárenská vyhlídka.

c) To place increased emphasis on respecting the cultural values of the affected area, which in the monitored area represents in particular a combination of the values of the seat and the cultural landscape of carriage horses formed by centuries in Kladruby nad Labem.

The proposed plan will not affect the residential area or the composed landscape on the right bank of the Elbe in the vicinity of Kladruby; the projected mining is situated in areas of anthropogenic – artificially created relief; Designed processing plant for areas with manufacturing or industrial development. The final state of the territory after the end of mining assumes the restoration of the terrain configuration close to the current state (including the height level) and conceptual natural-landscape modifications after the mining of the restored terrain.

d) Ensuring a minimum load on the surrounding landscape (especially visual impacts, but also negative load for vegetation components of the landscape, aspects of conditions for breeding an exceptional type of horse, etc.) in connection with the implementation work of the proposed reclamation. The permeability of the area must not be affected by the long-term burden of the implementation of the project. The Ministry also draws attention to the hydrogeological conditions and specifics of the territory, which must not be affected by another project in the historical protected landscape.

The visual impact of the planned mining will be differentiated due to its course – phasing. The progress of mining works is designed in a favourable way – to limit the manifestation of the mined area as much as possible. In the final stage, including the restoration of the terrain configuration close to the current state and conceptual vegetation modifications, it can be assumed that the effect of the existing tailings in the landscape image will be improved.

The premises of the processing plant are situated in an industrially utilized area (brownfield character), its visual manifestation from all relevant views will occur together with the neighboring Chvaletice power plant, which will continue to form the primary architectural landscape dominant.

On the right bank of the Elbe, there will be no burden on the vegetation component of the landscape or any influence on the hydrogeological conditions.

9. National Heritage Institute, Directorate General, ref. NPU-310/60367/2020 of 25.8.2020

In its statement on the plan, the National Heritage Institute (NPÚ) states that the "Recycling of the Chvaletice – Trnávka tailings project", as defined, may have a significant impact on the environment and states the following requirements and comments:

a) Requirement to take into account the interests of state monument care and to set up compliance with the interest in the protection of cultural-historical values.

b) The proposed plan must take into account the sustainability of historical compositional solutions, the specifics of management and the historical context that are subject to protection under the Heritage Act in heritage protected localities and cultural landscapes. In addition, proceedings are currently underway to declare a protective zone for the Stud Farm in Kladruby nad Labem for the area south of the Elbe River, which also includes the tailings in question. For this protection zone, the relevant heritage conservation authorities proposed 2 and specific conditions for future possible building plans. There is also a direct context with important heritage areas, such as the landscape conservation area of Kladrubské Polabí rej. No. USKP 2491, National Cultural Monument Kladruby nad Labem rej. No. USKP 272– 16212/6-2096 and especially the UNESCO World Heritage Site Landscape for breeding and training of ceremonial carriage horses in Kladruby nad Labem rej. No. USKP 13 and its buffer zones. USKP 7013.

c) To place increased emphasis on respecting the cultural values of the affected area, which in the monitored area represents in particular a combination of the values of the seat and the cultural landscape of carriage horses formed by centuries in Kladruby nad Labem.

d) Ensuring a minimum load on the surrounding landscape (especially visual impacts, but also negative load for vegetation components of the landscape, aspects of conditions for breeding an exceptional type of horse, etc.) in connection with the implementation work of the proposed reclamation. The permeability of the area must not be affected by the long-term burden of the implementation of the project. The National Heritage Institute also draws attention to the hydrogeological conditions and specifics of the area, which must not be affected by any other project in the historical protected landscape.

Given the identical expression to MK's, the response is given above.

10. Povodí Labe, s.p., Department of Water Resources Care, ref. PLa/2020/034485 of 3.9.2020

In its statement, the river basin manager and the Elbe River manager make the following comments and requests:

a) The documentation should document that not only the resulting quality of discharged wastewater given by the above-mentioned table from the Government Regulation will be observed, but also that the discharged wastewater will not negatively affect the quality of surface water (including sediment quality) in the Elbe (at various hydrological conditions - average flow, minimum flow, ...), i.e. the increase in pollution compared to the current values should be calculated and compliance with permissible pollution values and standards should be guaranteed environmental quality (EQS) according to Government Regulation No. 401/2015 Coll., as well as water safety for living organisms.

The required assessment is carried out in Annex No. 4 of the documentation. The evaluation shows that even in the least favourable state (the emitted parameters reach maximum concentrations and the flow rate in the Elbe reaches minimum values of Q355 = 17.1 m3/s), the discharge of wastewater by the intention will have a negligible impact on the overall state of the parameters in the Elbe. Even with the contribution of discharged wastewater, the concentrations of individual parameters in the Elbe will continue to meet the criteria of permissible surface water pollution according to Annex 3 to Government Regulation No. 401/2015 Coll. The impact is only temporary for the duration of the project's operation.

b) From the point of view of the interests given by the valid National Plan of the Elbe River Basin and the Plan of the Upper and Middle Elbe Sub-Basin of the Elbe River Basin of the Elbe, s.p., it requires that the discharged wastewater meets the requirements for emission limits according to the emission levels associated with the current best available techniques. The evaluation should include all relevant substances or parameters whose content can be expected in wastewater discharged into the Elbe (also due to the chemicals used in the technology), e.g. N-NH4, SO4, etc.

The design of wastewater discharges and their parameters takes into account the relevant Best Available Techniques Reference Documents (BREFs) or BAT conclusions under Directive 2010/75/EU. – see the relevant text in Part B of the dossier and Annex 4.

c) Povodí Labe, s.p., points out that the water body HSL_1180 – Elbe from the Chrudimka stream to the Doubrava stream does not reach good status. According to the Community Water Policy Framework Directive 2000/60/EC, good status of bodies of surface water is to be achieved by the end of 2027 at the latest. Indicators of chemical status exceeding the limits include, among others, mercury and its compounds.

The surface water body in question 'HSL_1180 Elbe from the Chrudimka stream to the Doubrava stream' is defined as a heavily influenced water body whose status is generally assessed as unsatisfactory. From the point of view of chemical status, the body is classified as "not achieving good status" due to the occurrence of above-limit values of substances from the group of polycyclic aromatic hydrocarbons and perfluorooctane sulfonic acid. These substances and other other priority substances will not be used during the operation of the project, so the implementation of the project cannot deteriorate its chemical status or hinder the achievement of potential objectives for improving its chemical status.

d) Furthermore, the river basin administrator states that according to Annex 1 to Government Regulation No. 169/2006 Coll., amending Government Regulation No. 71/2003 Coll., on the determination of surface waters suitable for life and reproduction of native fish species and other aquatic animals and the determination and assessment of the quality status of these waters, the Elbe watercourse in the section in question is declared carp water.

With regard to the composition of wastewater discharged from the operation of the recycling plant into the Elbe, it is necessary to exclude that the project could lead to a deterioration of the status or potential (or its components or indicators) of the affected water body (HSL_1180 – Elbe from the Chrudimka stream to the Doubrava stream – a strongly influenced body), which may result in the failure to achieve a good ecological potential.

The water impact assessment (Annex 4) shows that the aspects of water planning (Act No. 254/2001 Coll., Directive No. 2000/60/EC) of the project will not cause deterioration or failure to achieve good chemical status and ecological potential of the surface water body "HSL_1180 the Elbe from the Chrudimka stream to the Doubrava stream". The implementation of the project will in no way lead to a negative change in the quantitative and qualitative status of the surface water body concerned, nor will it hinder the achievement of the objectives under the Water Framework Directive. If the project is implemented, a slight improvement in the qualitative status of the concerned surface water body can be expected.

e) Rainwater disposal from the area must also be in accordance with the standards TNV 75 9011 "Rainwater management" and ČSN 75 9010 "Rainwater infiltration equipment".

The intention does not contradict the stated standards at this stage of preparation. Rainwater management is described in the documentation and in the next stages of the preparation of the plans, especially in the documentation for the zoning procedure, the standards will be respected.

11. Statement within the Ministry of the Environment (Department of General Nature and Landscape Protection; Department of Species Protection and Implementation of International Obligations; Department of Waste; Department of Water Protection; Department of Environmental Risks and Ecological Damage; Department of Air Protection)

- ***Statement of the Ministry of the Environment: Department of General Nature and Landscape Protection of 5 August 2020***

  It states that with regard to the definition of the plan in the territory of the Pardubice Region, the statement on the plan according to the organizational rules falls under the competence of the Ministry of the Environment, Department of State Administration Performance VI – Hradec Králové and does not apply any other requirements for the preparation of EIA documentation.

  No comments.

- ***Statement of the Ministry of the Environment: Department of Species Protection and Implementation of International Commitments of 5 August 2020***

  No comments.

  No comments.

- ***Statement of the Ministry of the Environment: Waste Department, ref. MZP/2020/720/3479 of 12.8.2020***

  a) Table 47 "Overview of demolition waste" lacks specific catalogue numbers of the listed wastes according to Decree No. 93/2016 Coll., on the Waste Catalogue.

  The catalogue numbers have been supplemented in accordance with Decree No. 8/2021, Decree on the Waste Catalogue.

b) When carrying out construction and demolition activities, we recommend proceeding according to the "Methodological Manual of the Waste Department of the Ministry of the Environment for the Management of Construction and Demolition Waste and for Their Management" from 2018.

Request accepted. The measures to minimize the effects within the construction phase include the requirement to include the conditions from the cited methodological instruction in the documentation for follow-up proceedings, specifically the building permit procedure.

c) Table 49 "List of waste in normal operation" shows waste code 200303 Street sweepings in quantities of 10 000 kg per year. Is this a mistake in the number or is the waste not misclassified?

Given the assumption of regular cleaning of intra-area roads and, if necessary, the adjacent section of public roads, this is a realistic estimate.

d) Table 51 'Wastes arising from the operation of the processing plant' does not specify waste of group 17 Construction and demolition waste.

Construction and demolition waste will not be generated during the period of operation.

e) The tables given in the chapter "WASTE" show treatment methods 1 - recovery and 2 - disposal. A distinction should be made between recovery or disposal in the waste facility itself or the transfer to an authorised person for recovery or disposal.

Recovery of waste in the facility itself is only possible for excavated soil and construction and demolition waste from the construction period. These wastes will be used for remediation and reclamation of dumps, unless they are classified as a by-product – see above the response to the statement of the Czech Environmental Inspectorate. Other waste will be handed over to external entities, i.e. to waste management facilities.

- ***Statement of the Ministry of the Environment: Department of Water Protection, ref. MZP/2020/740/974 of 1.9.2020***

a) Groundwater in the vicinity of mining is significantly contaminated (especially Mn, Fe, Al, SO_4^{2-}) and the implementation of the project should contribute to a significant reduction in the content of these substances.

A statement of fact.

b) It is also mentioned that the tailings material also contains heavy metals (Zn, Cu, Co, Ni and Pb). These metals are classified as dangerous harmful substances according to Annex No. 1 to the Water Act (Act No. 254/2001 Coll., as amended), so we draw your attention to the need to comply with Section 39 of the Water Act. The implementation of the project must not lead to an increase in the content of these contaminants in surface water or groundwater.

During the actual extraction or storage of mining waste, no water from open workplaces will flow outside the mining area, so there can be no contamination of water.

After completion of remediation and reclamation, mining waste will not be in contact with groundwater or surface water. Clean rainwater from the isolated *surface of the repository will flow in a controlled manner into the Elbe River, or it will soak in the surroundings.*

Industrial wastewater from the processing plant will be treated to pollutant values, which will allow it to be smoothly discharged into the recipient – the Elbe River.

c) During the implementation of the plan, the water conditions must not be negatively affected (Section 27 of the Water Act), groundwater must be negatively affected (Section 29 of the Water Act) or the groundwater level must be substantially reduced (Section 37 of the Water Act). Since the waters in the area of the deposit are according to the Mining Act (Act No. 44/1988, as amended) mining water, we draw your attention to the provisions of § 107 paragraph 1 point. i) the Water Act, on the basis of which the manner and conditions for the discharge of mine water into surface water or groundwater shall be determined by the regional authority. The permissible pollution of discharged mine water into surface waters is determined by the water management authority adequately according to Government Regulation No. 401/2015 Coll. on the basis of § 14 of this Regulation.

No mine water will be discharged during the implementation of the project. Mine (rainwater) water will be captured during mining and used in the treatment process. This will involve a smaller part of the water needed in the processing plant, most of the water will be taken from the Chvaletice power plant.

Only treated industrial and treated sewage will be discharged.

d) In the Notification of the Intention and in the Environmental and Public Health Impact Assessment, it is mentioned that no industrial wastewater will be generated. Technological wastewater with an annual volume of 31,700 m3 is to be generated, which is to be treated in the area WWTP and subsequently discharged into the Elbe River. These waters are industrial wastewater within the meaning of Government Regulation No. 401/2015 Coll.

The issue of wastewater is elaborated in detail in the documentation. Industrial wastewater will be treated and discharged into the Elbe.

e) Any implementation of the project must take place in accordance with the Water Act and related legal regulations.

Compliance with all pertinent legal provisions is mandatory and will be adhered to accordingly.

- ***Statement of the Ministry of the Environment: Department of Environmental Risks and Ecological Damage of 6.8.2020***

  No comments.

  No comments.

- ***Statement of the Ministry of the Environment: Department of Air Protection, ref. MZP/2020/780/1921 of 4.9.2020***

  a) Requirement to provide a detailed list of all measures to eliminate TZL (particulate matter, dust) into the air for individual stages that will arise during the removal of overburden, own extraction of raw materials, land reclamation so that the technical conditions of operation to eliminate TZL are met according to Decree No. 415/2012 Coll.

The dispersion study proposes measures to eliminate or minimize dust in accordance with the requirements of Decree No. 415/2012 Coll. for point 4.5 in Annex No. 8. However, it should be noted that very wet material of mushy consistency will be handled, both in the case of raw material and deposited mining waste. Therefore, anti-dust measures are mainly aimed at reducing resuspended dust and dustiness during overburden coverage.

Further specification of these measures is of course possible within the draft conditions of the opinion on the environmental impact assessment and, in particular, in subsequent proceedings within the issuance of binding opinions pursuant to § 11 para. 2) of Act No. 201/2012 Coll.

b) Requirement to specify the proposal for the inclusion of individual stationary sources of air pollution (mining and production of manganese products) according to Annex 2 of Act No. 201/2012 Coll., and to evaluate compliance with technical conditions of operation or specific emission limits according to Decree 415/2012 Coll. (Annex No. 8).

Manganese ore mining falls under point 5.11 of Annex 2 to Act No. 201/2012 Coll. Technical conditions of operation were designed in accordance with the cited provision (see the previous point). Specific emission limits are not set for mining activities.

The treatment of manganese ore by magnetic separation and electrowinnig does not have a corresponding classification in Act No. 201/2012. Classification under point 4.7 Treatment of non-ferrous metal ores could be considered. However, the air pollution limit corresponding to this activity according to Decree No. 415/2012 Coll. is set only for TZL at 50 mg/m3 (point 3.6.1. of Annex No. 8). This emission limit will be met with a reserve. See dispersion study for details.

c) The Air Protection Department of the Ministry of the Environment also points out that the quantification of TZL emissions should be based on the currently valid Communication of the Department of Air Protection, which determines emission factors, which was published in the Ministry of the Environment Bulletin in 2019 (November).

Due to the deadline for processing the dispersion study, the current Communication of the Ministry of the Environment (December 2021) was taken into account.

d) Requirement to provide a more detailed description of emission reduction technologies that will be used in the processing plant (scrubbers) – efficiency of the selected equipment, concentration of pollutants at the outlet to ambient air.

The required data were added to the dispersion study.

e) Requirement to add the technological production process to the documentation with drawing of individual vents into the ambient air. Furthermore, the Waste Department of the Ministry of the Environment requests to specify whether it is a closed process without the possibility of leakage of fugitive emissions into the air and whether TZL (metal) emissions (e.g. from dryers or other processes) can be expected from the individual production steps in addition to NH3 and H2SO4 emissions and in what quantity and concentration.

The data are added to the dispersion study and to the EIA documentation. The possible emission of metallic manganese during its final processing is also taken into account.

In general, however, regarding the emission part, it can be stated that the emissions were determined by the designer and investor with a margin on the safe side due to the degree of preparation of the project. Specified emission calculations will be provided in follow-up proceedings, e.g. also within the preparation of an expert opinion for the purpose of issuing binding opinions pursuant to § 11 paragraph 2) of Act No. 201/2012 Coll.

The scheme of the technological process and the situation diagram of the objects with the drawing of the vents are in part H of the documentation.

12. Hunting Association Řečany nad Labem, without ref. number dated 2.9.2020

At the beginning of its statement, the hunting association Řečany nad Labem expresses its concern over the name of the project "Recycling of the tailings Chvaletice – Trnávka" and believes that the term "recycling" was used intentionally because it sounds ecological and probably recycles to pay a lower tax to the state than mining itself, which, in their opinion, is undoubtedly in question. In its statement, the Hunting Association Řečany nad Labem further states the following comments:

Recycling is associated with the extraction of a deposit of a reserved mineral, this is sufficiently stated in the notification and documentation. Mining areas will be determined for mining and mining activities will be permitted by the state mining administration. Statutory payments from the mining area and from extracted minerals pursuant to Government Regulation No. 98/2016 Coll. will of course be paid.

a) It is not clear from the study how animals will be treated, both protected and endangered species, but also living mammals, birds, amphibians, which are abundant in this locality mainly due to the Elbe watercourse and other blind branches, where the revitalization of the blind branch of the Elbe in the cadastral area was even carried out this year. Trnávka under the patronage of the Operational Programme Environment and co-financed by the European Union in the total value of CZK 11.2 million. This arm is directly located from the eastern side of the land required for mining Mn. From the north and west side, the Elbe River surrounds the land. Therefore, thanks to water sources, there is a high migration of animals that occur here and should continue to occur. The association also asks for an explanation of how these animals will be treated.

Details on the impact on individual specially protected animal species are provided in the documentation, including a proposal for measures to minimize or compensate for any negative impacts.

The blind arm will not be affected at all by the implementation of the plan. For possible rescue transfers of amphibians, it is proposed to use this biotope as a destination for transfers.

b) The association asks for clarification at what time will take place any felling of trees and vegetation, with regard to animals. In particular, whether it will be a period of dormancy and further points out that under no circumstances should felling take place during spring migration, laying of young and nesting of birds, according to the Nature Conservation Act.

Felling of trees will be carried out in the non-vegetation and non-nesting period.

c) Furthermore, the Hunting Association Řečany nad Labem draws attention to the storage of contaminated waste with sulfuric acid and expresses concern about the leakage of not only a strong odor into the air near the rest zone and subsequently downwind to the surrounding villages, caused by chemical reactions, but also over the contamination of water with H2SO4, which may be increased even during torrential rains. Furthermore, the association expresses concerns about the run-off of contaminated water on the slopes of elevated land and the subsequent contamination of blind branches of the Elbe River.

Mining waste will not be contaminated with sulfuric acid, and it will not produce any odor. All mining waste will be deposited exclusively in a secure and isolated area. Water that comes into contact with mining waste will be used in the production process and after treatment will be discharged into the Elbe. Rainwater from the mining area flowing outside of it will only come from the already insulated parts of the new dump, ensuring it is clean and uncontaminated. This is in contrast to the current situation, where all rainwater from tailings enters the environment.

d) The association requests the addition of information on how the state administration will be supervised, both in the area of mining, compliance with hygienic limits, as well as inspections in the area of environmental protection and wildlife in the locality.

Supervision by the state administration will be carried out by individual authorities in accordance with legal requirements. These will be the Czech Environmental Inspectorate, the Regional Hygiene Station, the Regional Authority of the Pardubice Region and in the area of mining also the District Mining Authority. The conditions for carrying out supervision will be based, among other things, on the conditions of the relevant binding opinions, one of which will be a binding opinion on the environmental impact assessment. The draft measures for control and monitoring of impacts are specified in Part D.IV of this documentation and may be further modified by the author of the opinion and the competent EIA authority.

e) Another comment concerns the transport of H2SO4 and CaCO3, according to the association, the transport is not solved, and the affected municipalities have not been addressed.

The main commodities, i.e. CaO and H2SO4, will be transported in railway wagons designed for this purpose. Their transport and further handling will be carried out in accordance with legal requirements. This is a standard activity.

f) The hunting association Řečany nad Labem also expresses concerns about the issue of employment. In particular, it draws attention to the lack of qualified employees and the employment of foreign workers.

As an annex to this documentation is included the report "Socio-economic study of the expected impacts of heap recycling in Chvaletice" (Faculty of Science, Charles University, Prague. 2021). Negative socio-economic impacts are not identified.

g) The association expresses concern about the processing of rock and its handling, especially the process of rock extraction, its enrichment with H2SO4 and return to its original location, which, according to the association, does not represent a recycling process, but the creation of a new environmental burden. They also see a problem in the remediation and reclamation plan, its feasibility and overall implementation, and recall that this process has already taken place in the locality once and now everything will be repeated.

The entire process of extraction, manganese recovery and restorage is designed, considering all environmental aspects and is subject to the EIA process. Individual impacts are assessed in this dossier. Given that in addition to recycling it is also mining, the site will be under the supervision of the State Mining Administration and the disposal of mining waste will be governed by Act No. 157/2009 Coll., on Mining Waste Management and Related Regulations.

Mining waste will not be enriched with sulfuric acid. While sulfuric acid is utilized in the leaching process, the residue from leaching undergoes neutralization, washing, and drainage. It is clear from ecotoxicity tests that this residue does not exhibit ecotoxic properties.

13. Pavlína Hamáčková Muchová, Ph.D., without ref. of 28.8.2020

The statement gives a dissenting opinion on manganese mining in tailings in the village of Trnávka near Chvaletice, for the following reasons:

a) There is no properly published study that confirms a significant presence of manganese in groundwater, in the wells of the population, which allegedly harms human health, and also that manganese mining would clean the earth and groundwater.

   Manganese groundwater contamination is evident from the annual groundwater monitoring, the results of which are summarised in the Water Impact Assessment (Annex 4). Groundwater samples from the area of the tailings and its immediate surroundings show a significant increase in concentrations of some parameters, especially manganese (concentration of Mn in the order of tens to the first hundreds of mg/l, max. 997 mg/l), as well as sulphates, iron, aluminum, ammonium ions and in some cases also in chromium, lead, zinc. However, this report also mentions the fact that the concentration of manganese in water in domestic wells is significantly lower. The tailings do not have a direct impact on the quality of groundwater in these objects because they are located upstream of groundwater. However, the removal of manganese and the security of the mining waste repository will clearly reduce the possibility of manganese being released into the environment.

b) The occurrence of dust and noise during mining, which will not be able to remove, because the village of Trnávka is in the immediate vicinity of the project.

   The level of noise and dust is assessed in the attached noise and dispersion study and in part D of the documentation. The plan is designed so that these impacts are not the cause of exceeding the relevant hygienic and immission limits and do not significantly worsen the existing burden on the territory.

c) Removal of groundwater from the surroundings. In the current time of drought (this year is exceptional for its rainfalls), such a huge amount of water, both underground and rainwater, is to be taken and used for industry, which is unimaginable for the population. Furthermore, the issue of wastewater is highlighted in the statement.

   The project presented in this EIA documentation no longer contains groundwater pumping, unlike the phase of notification of the intention.

   Wastewater will be treated and subsequently discharged into the Elbe according to the conditions of the water management authority.

d) Labour shortages and recruitment of foreign workers.

As an annex to this documentation is included the report "Socio-economic study of the expected impacts of heap recycling in Chvaletice" (Faculty of Science, Charles University, Prague. 2021). Negative socio-economic impacts are not identified.

e) Completion of the revitalization of the blind branch of the Elbe in Trnávka, supported by 100% of the EU (about CZK 11 million). The arm occurs a few meters from the site of planned mining. The statement draws attention to the impact of the start of mining on this EU subsidized section, mentions the disappearance of water in the Elbe branch, the withering of freshly planted trees, the death of dragonflies and frogs, which are part of the arm.

The groundwater level and the water level in the blind arm in the environment of permeable rocks of the river floodplain, depend on the level of the Elbe. The project will not affect the level of the Elbe, the groundwater level, or the level of the level in the blind arm.

f) Destruction of the landscape for several decades. The planned planting of trees is unrealistic, due to the destroyed soil and drought.

Mining will be carried out in stages and the area with the mining waste repository will be quickly and continuously reclaimed "behind the back" of mining. There will be no influence, let alone destruction, of the surrounding landscape, only the section of tailings where earthworks will take place will always be uncovered. The proposed method of biological reclamation (see the attached Comprehensive Remediation and Reclamation Plan) will ensure rapid biological recovery of the area.

g) The proximity of the stud farm Kladruby nad Labem and its charming surroundings registered on the UNESCO list.

See the commentary on the statement of the Ministry of Culture.

h) Immediate vicinity of the busiest railway line towards Prague – Slovakia / Poland / Hungary.

Railway noise is evaluated in an acoustic study. The very proximity of the railway line does not conflict with the proposed plan. Material from the mining area to the plant and vice versa will be transported in a technological bridge that will run over the railway line.

i) Reduction of the value of the land of Pavlína Hamáčková Muchová, Ph.D.

The issue of property prices is not subject to environmental and public health impact assessments.

PART A: INFORMATION ON THE INVESTOR

1. Business name

MANGAN Chvaletice, s.r.o. (refferd as Investor or Notifier in the Document)

2. ID

25327542

3. Residence

MANGAN Chvaletice, s.r.o.
U Kulturního domu 158
533 12 Chvaletice

4. Name, surname, place of residence and telephone number of the authorised representative of the notifier

name:	Ing. Jan Votava, executive
address:	Medová 3603, 276 01 Mělník
phone:	+ 420 606 626 555
Email:	jvotava@mn25.cz

PART B: INFORMATION ABOUT THE PROJECT

I. BASIC DATA

1. Name of the project and its classification according to Annex No. 1

Title:

Recyklace odkaliště Chvaletice – Trnávka (Chvaletice_Trnávka Tailings Reclamation)

Inclusion of the project pursuant to § 4 paragraph (1) of Act No. 100/2001 Coll., on Environmental Impact Assessment and on Amendments to Some Related Acts, as amended (hereinafter referred to as the Act):

<u>Category I:</u> projects always subject to assessment, MoE column

<u>Point 19:</u> Installations for the production of non-ferrous raw metals from ore, concentrates or secondary raw materials by metallurgical, chemical or electrolytic processes.

<u>Point 79:</u> Determination of the mining area and the surface mining of mineral resources proposed therein on an area above the specified limit (a) or with a proposed open-cast mining capacity above the specified limit (b). Peat extraction above the specified limit (c).

The project with its capacity (area and capacity of the proposed mining exceeds the limits for category I.

<u>§ 4 subsection (1) letter a): projects</u> listed in Annex 1 to this Act of category I and changes to these projects, if the change of the project by its own capacity or scope reaches the relevant limit value, if specified; these projects and changes to projects are always subject to assessment.

<u>The submitted project falls under the category I classification, as outlined in point 79, and in accordance with § 4 para. (1) Letter a), the project is subject to assessment.</u>

2. Capacity (scope) of the project

Mining capacity

The mining capacity is based on a balance of 26,644,344 t of recoverable reserves of raw material (manganese tailings) in the dry state, the natural humidity of the deposit is 21%. This amount of manganese tailings will be extracted in about 25 years, which represents an annual extraction of about 1,065,770 t (dry raw material). After taking into account the moisture content of the raw material, the average extraction is about **1,289,580 tons** of material per year.

Surface scale of mining:

The area of the proposed mining area (DP) Trnávka is **1.193475 km2** and is divided according to the cadastral areas of the municipalities concerned as follows:

Table No. 1: Area of the Trnávka mining area

Municipality (c.a.)	MUNICIPALITY CODE	CODE c.a.	Share of DP area in c.a. (km^2, %)	
Trnávka (Trnávka)	530 794	744 794	0,980011	82,11 %
Chvaletice (Chvaletice)	575 071	655 015	0,213464	17,89 %

In addition to the DP, other areas will be affected in the mining part of the project, the total area of which is **0.124483 km2** and its division according to the cadastral areas of the municipalities concerned is as follows:

Table No. 2: Area extent of affected areas outside Trnávka DP

Municipality (c.a.)	MUNICIPALITY CODE	CODE c.a.	Share of DP area in c.a. (km^2, %)	
Trnávka (Trnávka)	530 794	744 794	0,023807	19,12 %
Chvaletice (Chvaletice)	575 071	655 015	0,100676	80,88%

Production capacity of the processing plant

In the processing plant, the mined material of the Chvaletice – Trnávka tailings will be reworked, where the final product will be high-purity electrolytic manganese metal and manganese sulphate monohydrate crystal. The production process is conducted in two stages. In the first stage, the high purity electrolytic manganese metal (EMM, purity higher than 99.9%) will be produced. In the second stage, a portion of the produced manganese metal undergoes processing to yield high-purity manganese sulphate monohydrate crystal (MSM, purity higher than 99.9%).

The processing plant is designed for a lifespan of 25 years with the production of 50,000 t/year of pure metal manganese. It is expected that two-thirds of the annual production of manganese metal flakes will be converted to approximately 100,000 t/year manganese sulphate monohydrate. Meanwhile, one third of the annual manganese metal production, with a purity exceeding 99.9% Mn, will be shipped in the form of metal flakes as a product. The high purity manganese mulphate monohydrate (HPMSM) will be manufactured to contain at least 99.9% manganese sulphate monohydrate (MSM) and at least 32.24% manganese. This product will be shipped in crystalline form.

Table No. 3: Production capacity

Commodity	CAS	Annual production capacity
Manganese metal	7439-96-5	50 000 t/year in the form of pure metallic Mn, of which 33 000 t/year will be used as input material for the production of manganese sulphate monohydrate and 17 000 t/year of metallic manganese as final product
Manganese sulphate monohydrate	10034-96-5	100 000 t/year

Justification of the time scope of the project:

When preparing this EIA documentation, the Methodological interpretation of selected points of Annex 1 to the Environmental Impact Assessment Act and related provisions (Ministry of the Environment of 1 October 2018, Ref. No.: MZP/2018/710/3250) was also taken into account. Here it is stated: *"Mining intentions are specific to other intentions in that they change over time as mining progress in the area. Given that at the time of the environmental impact assessment of these projects are not clear, for example, mining technologies, transport context, the state of individual environmental components and priorities for their protection, the shift in legislation or the possible development of state concepts concerning mining in the very distant time horizon, is based on § 5 subsection 2 of the ZPV it is necessary that the relevant environmental impact assessment of these projects be carried out for a realistically evaluable period, which is about 20 years. According to the practice in environmental impact assessment (from 2002 to the present), this is the period for which it is realistic to carry out an environmental impact assessment of sufficient quality. It is therefore necessary that this fact is respected in the relevant documents (notification of the plan, documentation of the environmental impact of the project) by their processor (in the case of a project for a longer period of time, it is necessary to divide the mining into stages and always assess only the stage for the next 20 years, including the determination of the mining area), checked by the relevant authorities, and that this fact is also taken into account in the screening procedure or in the binding statement pursuant to § 9a par. 1 ZPV."*

Due to the capacity of the proposed new processing plant and the cost-benefit analysis, the developer has opted for a project lifetime of 25 years. This period therefore exceeds by 5 years the period stated in the methodological interpretation. Nevertheless, the plan is presented in this form and its effects are evaluated for the entire period of its implementation. This solution is based on the following reasons:

1. The project does not involve the extraction of primary raw materials, but the gradual extraction and reprocessing of historical mining waste deposited in the tailings area. Additionally, the project entails the construction and operation of a processing plant.
2. The intention of the investor is the extraction of manganese from the raw material within the tailings, and thorough reclamation and remediation of the tailings area. At present, there is documented pollution within the area of interest, which spreads from the tailings area to the surrounding environment and the nearby flow of the Elbe. These facts are described in the relevant chapters of this text. The intention is therefore not only to extract and obtain manganese, but also to stop the spread of contamination from the affected area to the surrounding environment and the Elbe River.

   The project generates some influences only in the phase after remediation and reclamation. These are mostly positive effects, but they are based on the completion of the remediation of the area and the setting up of the post-project monitoring system. This makes it quite significantly different from other mining projects (quarries, sand pits), which can be comparatively easily phased, allowing for the evaluation of effects at individual stages. An assessment of the effects of the proposed project without taking into account the phase of completion would be incorrect and incomplete.
3. The plan was discussed in a comprehensive form with state administration bodies, concerned and surrounding municipalities and other organizations (Ministry of the Environment, Department of Environmental Impact Assessment, Department of Environmental Risks and Environmental Damage, Regional Hygiene Station in Pardubice,

Regional Authority of Pardubice Department of Nature and Landscape Protection and others). With regard to the complexity of the whole project (mining itself, processing plant, remediation of contaminated areas and near-natural reclamation with links to the adjacent cultural landscape under UNESCO protection), the plan was designed and presented for a period of 25 years from the beginning of its preparation.

During preliminary discussions, especially with representatives of the municipalities concerned, their concern was emphasized that the investor would not implement only the economically advantageous part of the project and the remaining activities, such as proper remediation and reclamation of the area and the overall interconnection of the area with the surrounding landscape, would not be left for later, or that the investor would leave and leave the activities in the area unfinished. For this reason, the entire plan is proposed by the investor and comprehensively assessed in the submitted notification within the entire period of 25 years, during which time it is technically, temporally and economically feasible to implement the plan with all its parts, i.e. mining, processing plant and land reclamation.

4. The authors of the environmental impact assessment believe that in this case the period of 25 years is so-called realistically evaluable within the meaning of the above-mentioned provision of methodological interpretation. This is mainly due to the fact that during the first 20 years from the commencement of the implementation of the plan, the bulk of the tailings area will be physically affected by mining. Extraction of tailings takes place in mining slopes with a certain slope, which are further divided into mining footbridges (the technical details of mining are explained in detail below). The method of mining implies that after the 20th year, the mining slopes will extend with their upper edge into the stage of the area defined as the 22nd year. It is also necessary to remove trees and overburden one year in advance, which means that the vegetation cover will be removed in the 20th year up to the area defined as the 23rd year.

   Taking this principle into account, we find that after the 20th year of mining, only the area defined as the 24th and 25th year in the south-eastern part of the deposit (tailings pond No. 2) will be in its original state. And within two years, the aforementioned preparation of the territory and the removal of vegetation cover will be carried out here. In such a situation, it can be stated with certainty that in this small part of the territory there will be no change in the state of the environmental components in 2-3 years that would fundamentally affect the impact assessment.

   This claim can also be supported by the results of long-term biological monitoring (details below). There are unfavourable conditions for vegetation growth in the area, which leads to so-called blocked succession and therefore it is not possible to assume a rapid or unexpected biological development of the territory. Due to stressful conditions, development at the site tends to die repeatedly. Even after more than 40 years of development, the tailings are still dominated by so-called pioneering tree species such as birch and aspen poplar.

5. The intention of mining and re-disposal was technically designed in great detail, above standard in the conditions of the Czech Republic. The technical solution is based on a detailed mining and transport study, it is calculated with variable inputs, especially with different metal content in individual parts of the deposit. This also results in a slightly different need for gross extraction of raw material in each year. Furthermore, the variable length of quarry roads in individual years was calculated. For each of the 25 considered

years of mining, the number of necessary mechanization and the time of their deployment, the number of kilometres driven, the resulting fuel consumption, etc. are precisely determined. A selection of suitable mechanization was also carried out with regard to the character of the mined material, the bearing capacity of the subsoil, the necessary slope inclinations, etc. It cannot be assumed that for the last 5 years of such a prepared project there will be a change in mining technology or transport context, as stated in the cited methodological interpretation of the Ministry of the Environment. The technology for extraction and re-storage was selected in order to maximize the economic efficiency of the project. The geological reserves of the deposit are documented and known in detail, mining will be terminated after 25 years by complete mining of the deposit and reclamation with the impossibility of further continuation of mining activities in the locality.

6. In the event that the plan was not dealt with comprehensively, but was divided into individual separately assessed stages, a situation would arise that the submitted plan would not contain an assessment of the phase of completion and remediation of the site. This is a crucial stage of the project, which has a detailed technical solution consisting of the implementation of the underlying layers, drainage, external insulation, soil fills, biological reclamation and preparation for subsequent use, which has already been consulted with the affected municipalities and landowners. The presentation and assessment of the project without the end of this stage would be perceived negatively by the state administration bodies and especially municipalities and the public and would be warned of the potential risks associated with it, especially that all stages will not be implemented by the investor and the expected post-project monitoring.
7. The financial aspect also plays an important role in the length of the project evaluation. With regard to the high initial investment costs associated with the implementation of the processing plant, the economic balance sheet is prepared for the use of the entire recoverable deposit. Shortening the implementation period of the project to 20 years, as stipulated by the methodology of the Ministry of the Environment for assessing mining, or assessing only a part of the plan, i.e. the 20 years, where the remaining 5 years would be assessed in the next phase, would cause uncertainty of the return on the costs incurred. This uncertainty would reduce the expected profitability and consequently affect the willingness to invest in such a limited project.
8. A possible (theoretical, not proposed by the investor) reduction of the mining period from 25 to 20 years would mean a 20% reduction in the duration of the project. Assuming that the entire amount of material should be processed, reducing the duration of operation would mean an increase in extraction and production capacity by 20%. This would have the following effect on the technical parameters of the plant:
   - Increase in extraction and transport of material from/to the mining area by 20%
   - Increase in production capacity by 20% - which means an increase in machinery by 20% and a related increase in the size of buildings by 10-15%
   - Increase in annual energy consumption (electricity, heat) by 20%
   - Increase in annual transport volume (raw materials, chemicals, manufactured products) by 20%
   - 20% increase in annual emissions
   - Increase of annual waste generated by 20%

- Increase in annual water consumption / production of wastewater by 20%, increase in the number of pollutants emitted in water (larger volume, same concentration) by 20%
- Increase in the number of employees and with it an increase in the amount of transport by about 10%
- Increase in noise in the plant, but also in the mining area. For the proposed capacity, the number of mining machines and means of transport is balanced, which would have to be increased. In the processing plant, the performance of HVAC equipment in particular would increase, respectively noise emissions.
- Increase of some other (less substantial) parameters by about 20%.

9. The duration of the project of 25 years was chosen as a result of optimising the size of the processing plant (limited area for construction, limited energy connection capacity, spare rail transport capacity, market capacity for product application, return on investment, etc.). Shortening the project time and consequently increasing the production capacity of the plant would lead to some difficult problems to solve:

- Increased demands on transport from/to the plant would require an increase in the capacity of the siding. Intensification of siding operation is not possible (restriction of siding operation at night), the only option would be to increase the siding area/track length. This would mean taking over part of the land needed for the construction of the plant with an impact on the layout of the plant.
- With the existing siding capacity, this occupies about 30% of the territory planned for the plant. The location of the buildings (layout) and their design (especially their height) were developed so that the visual impact of the plant (UNESCO Kladruby area) was minimized. In the case of an increase in the capacity/area of the siding, i.e. a reduction in the area for the production plant and a simultaneous increase in production capacity, would mean:
  - Construction of substantially taller buildings
  - Use of part of the land at Semenná Hůrka – the highest point of the land, the use of which for construction was not expected for the duration of the project for 25 years (the wooded land was considered as a shade zone with preservation of afforestation)

Both previous points have a substantial negative impact both on investments in buildings and landscaping, as well as on the visual aesthetics impact of the plant.

Increasing the height of the buildings would most likely also have a negative impact in terms of noise pollution in the residential areas of Trnávka, Chvaletice and Selmice.

- An increase in the consumption of input chemicals would in some cases (e.g. sulphuric acid) mean their import from significantly greater distances – i.e. a negative impact on both the load on transport routes and logistics costs.
- The currently designed capacity of the plant requires about 80 MW of electricity input. Increasing the capacity by 20% would mean an input of about 95-100 MW.
- An increase in production capacity of 20 % would mean (rough estimate) an increase in investment costs of about 30 % (an increase in the cost of machinery by about 10-15%, an increase in the cost of buildings and construction works by about 40%) while maintaining the same yield (the same amount of manganese produced and manganese

sulphate monohydrate). Elevated production costs due to longer-distance transportation would result in a considerable increase. The above would have a very significant impact on the reduction of the profitability of the project, respectively the project would very likely become unprofitable.

From the point of view of environmental protection, its individual components and the protection of public health, the proposed layout of the operation of the project for a period of 25 years appears to be favourable and minimizing the intensity and significance of the impacts.

The phasing of the project would pose a certain risk in terms of a possible delay in obtaining the relevant permits and the related possible interruption of mining, or the non-exploitation of the deposit with corresponding negative effects. From the point of view of environmental protection, the most suitable approach is probably to exploit the entire deposit without the risk of phasing, which also represents the implementation of remediation and reclamation in the entire mining area.

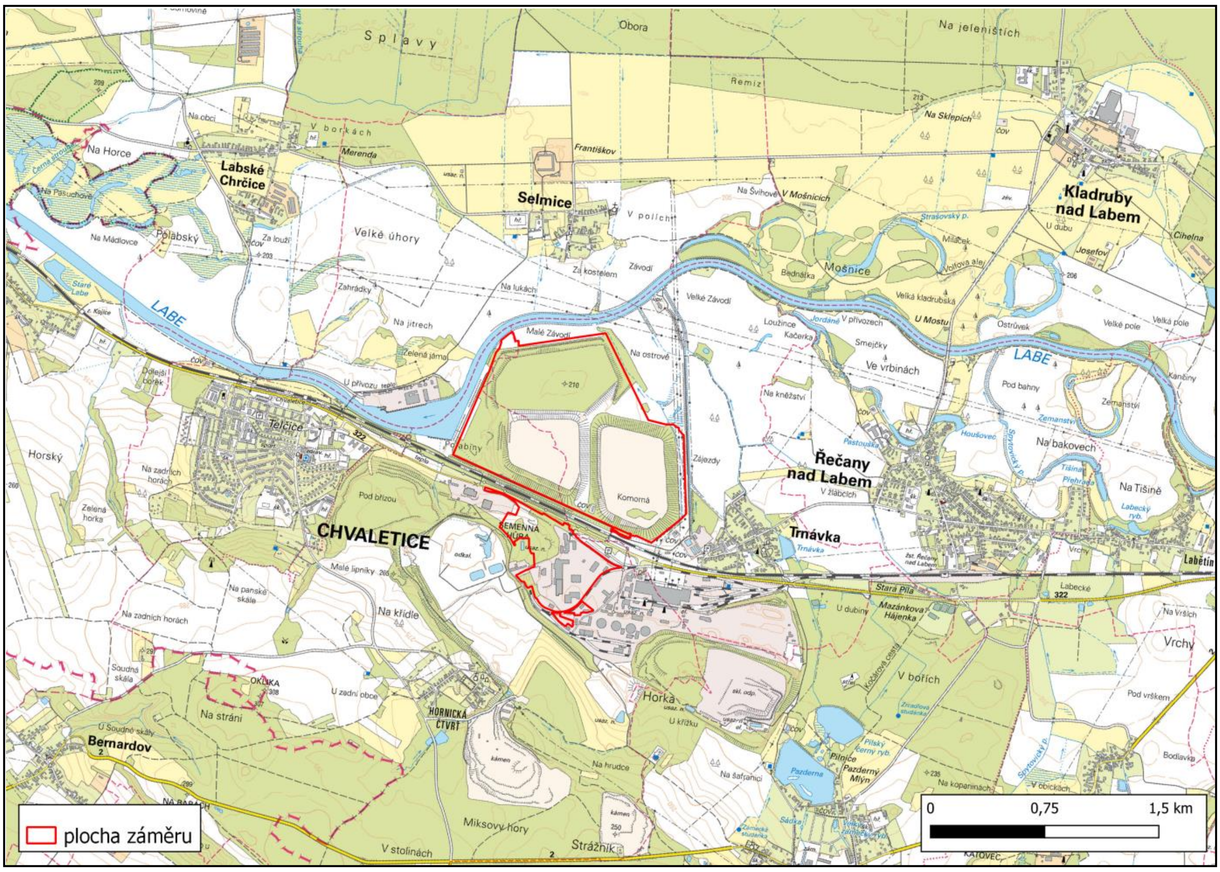
Based on the above-mentioned reasons, the proposed plan is in line with the objectives of the above-cited Methodological Interpretation of the Ministry of the Environment, the purpose of which is to emphasize increased protection of the environment and public health in the case of mining projects.

3. *Location of the project (region, municipality, cadastral area)*

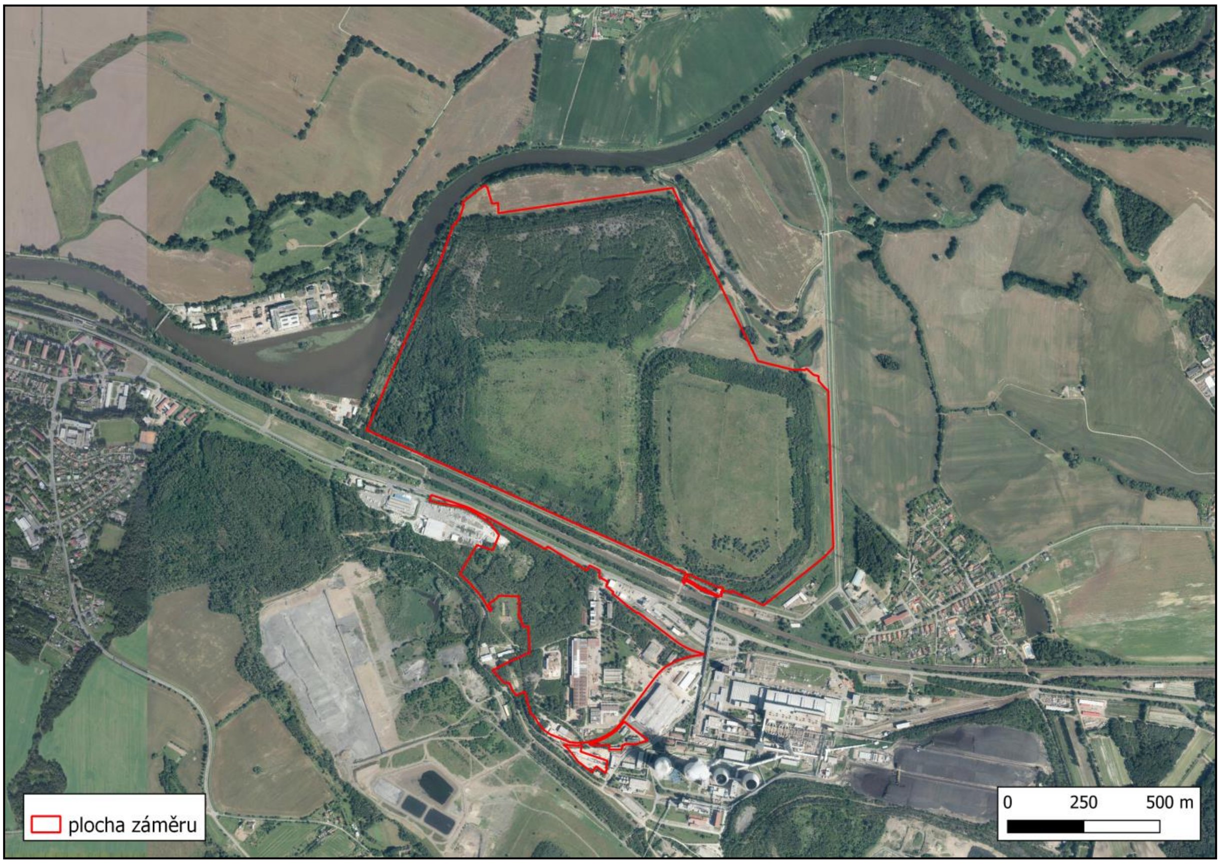
Region:	Pardubice Region (NUTS3 region code: CZ053)
District:	Pardubice (district code: 40436, NUTS4: 0532)
Municipality with extended powers:	Přelouč (code ORP: 1091, code according to the CZSO: 5311)
Municipality:	Chvaletice (MMR municipality code: 165697; CZSO municipality code: 575071)
Cadastral area:	Chvaletice (CA code: 655015)
Municipality:	Trnávka (MMR municipality code: 144797; CZSO municipality code: 530794)
Cadastral area:	Trnávka (CA code: 683264)

The project is situated on the territory of the municipalities of Chvaletice and Trnávka in the Pardubice Region. The project is proposed in two locations, which are separated from each other by the railway line 010 Prague – Česká Třebová and road II/322. The connection of the sites will be ensured by means of a technological bridge over the road and the railway and by road II/322. The location of the intent is graphically shown in the picture below.

Picture no. 1: The Position of the Intention in Broader Relations (ČÚZK)



Picture no. 2: Location of the project in the orthophoto map (ČÚZK)



Extraction of raw materials

The determination of the Trnávka mining area is proposed on the deposits Chvaletice-tailings ponds 1,2 and Řečany-tailings pond 3. The deposits are located about 14 km northeast of the town of Kutná Hora, about 24 km west of the town of Pardubice. It lies at an altitude of about 207 – 230 m near the Elbe River. The terrain here is open, clear, it is part of the East Elbe Board.

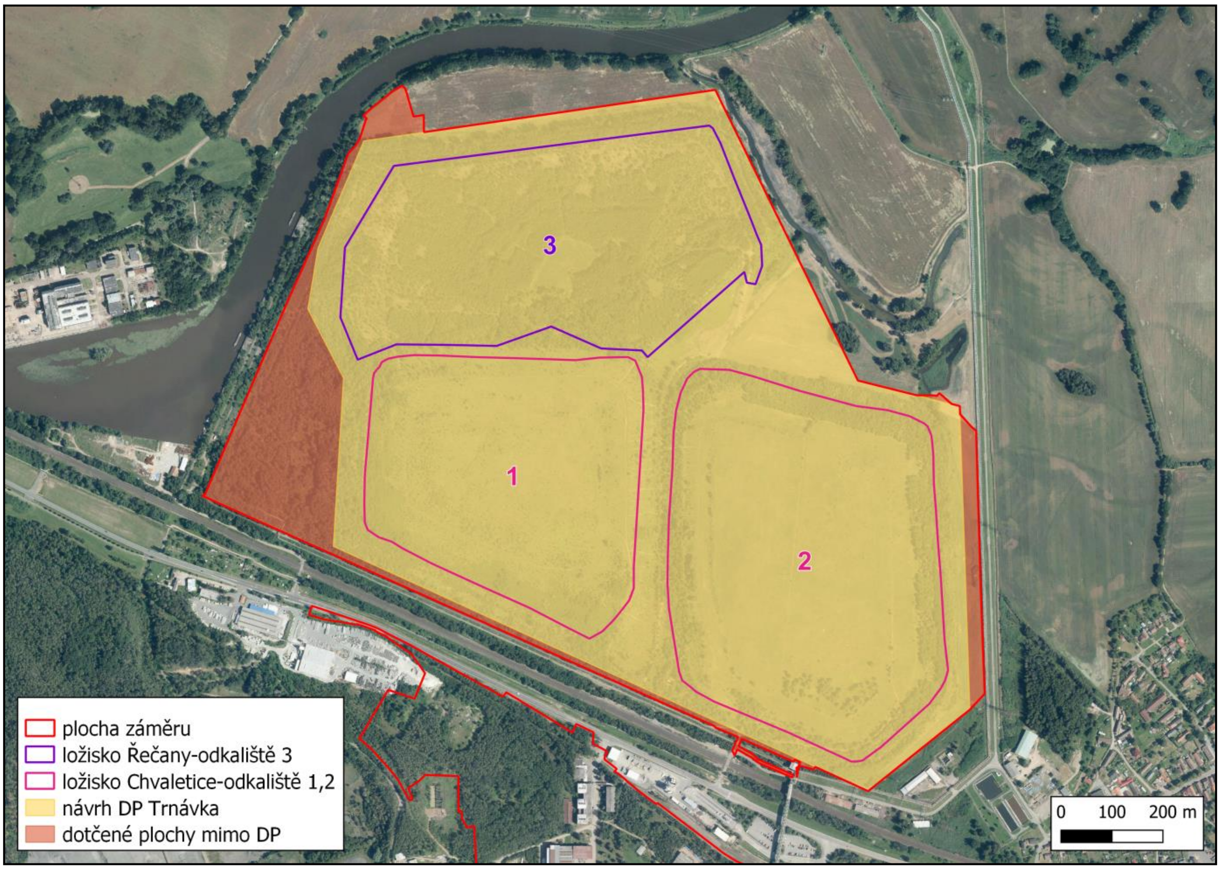
The proposed DP is located in the area of the repository of waste from flotation treatment of the raw material of the Chvaletice pyrite and manganese ore deposit.

The area of interest lies in the municipalities of Trnávka and Chvaletice. It is bordered from the south by the railway line 010 Praha – Česká Třebová with the parallel road II/322, from the east by artificial watercourses and agricultural land, and from the northwest by the Elbe riverbed.

The nearest settlements from the border of the mining area are Trnávka (residential area about 250 m southeast), Selmice (about 550 m north) and Chvaletice (about 1000 m southwest).

In the following picture (Picture no. 3) shows the location of manganese ore deposits Chvaletice-tailings ponds 1,2 and Řečany-tailings pond 3, which will be included in the proposed mining area. The intention will also affect the areas around the DT marked in this picture.

Picture no. 3: Localization of the proposed MGL and manganese ore deposits



Processing plant

The processing plant is proposed into an existing industrial area, which can be described as a brownfield, the area is situated in a southerly direction behind the railway line 010 Prague – Česká Třebová and road II/322.

It is a set of partially used buildings, mainly for small-scale production, storage, or administrative purposes. These limitedly used buildings in the area of the proposed processing plant will be proposed for demolition if the plan is implemented.

A number of industrial activities are operated in the vicinity of the proposed processing plant, the most important of which is the production of electricity and heat in the Chvaletice thermal power plant, located to the east.

The nearest residential buildings in relation to the mining part of the project are residential houses on the western outskirts of the village of Trnávka and houses on the southern edge of Selmice. In relation to the processing plant, the nearest residential development of Chvaletice – part of the Hornická čtvrť is situated in a southerly direction, the eastern outskirts of Chvaletice are already located at a greater distance.

The proposed project will affect the land listed in the following tables (Table No. 4 and Table No. 5).

Table No. 4: List of land affected by the project - mining part

Affected land - mining part			
Land - DP Trnávka (mining area)			
land	*c.a. (Cadastral area)*	*area (m2)*	*type of plot*
1170/1	Chvaletice	183 561	Other area
1170/4	Chvaletice	2 992	Other area
1170/7	Chvaletice	13 944	Other area
1170/8	Chvaletice	2 498	Other area
1175/2	Chvaletice	15	Other area
1176/1	Chvaletice	2	Other area
1180/2	Chvaletice	18	Other area
1180/3	Chvaletice	566	Other area
1180/4	Chvaletice	328	Other area
1180/5	Chvaletice	1 601	Other area
1180/9	Chvaletice	100	Other area
1180/10	Chvaletice	46	Other area
1180/11	Chvaletice	139	Other area
1180/12	Chvaletice	145	Other area
1180/13	Chvaletice	388	Other area
1180/14	Chvaletice	9	Other area
1180/15	Chvaletice	56	Other area
1180/16	Chvaletice	16	Other area
1180/17	Chvaletice	1	Other area
1180/18	Chvaletice	260	Other area
1180/27	Chvaletice	901	Other area
1180/28	Chvaletice	282	Other area
1180/29	Chvaletice	10	Other area
1180/30	Chvaletice	4 008	Other area
1180/31	Chvaletice	290	Other area
1180/32	Chvaletice	36	Other area
1180/33	Chvaletice	7	Other area
1180/34	Chvaletice	90	Other area
1180/36	Chvaletice	568	Other area
1180/38	Chvaletice	535	Other area
1180/39	Chvaletice	22	Other area
1180/40	Chvaletice	45	Other area
1180/41	Chvaletice	11	Other area
1180/42	Chvaletice	10	Other area
349/2	Trnávka	12 294	Other area
460/1	Trnávka	5 667	Other area
481/1	Trnávka	560 464	Other area
481/2	Trnávka	499	Other area

481/3	Trnávka	4	Other area
481/4	Trnávka	105	Other area
481/8	Trnávka	219	Other area
481/19	Trnávka	1 431	Other area
613/1	Trnávka	331 959	Other area
613/3	Trnávka	219	Other area
613/4	Trnávka	111	Other area
613/5	Trnávka	2	Other area
613/6	Trnávka	102	Other area
613/7	Trnávka	256	Other area
613/8	Trnávka	93	Other area
613/9	Trnávka	203	Other area
662/1	Trnávka	53 712	permanent grassland
666/2	Trnávka	36	Other area
666/4	Trnávka	3 567	body of water
995/6	Trnávka	748	body of water
995/24	Trnávka	315	body of water
1004	Trnávka	1 825	permanent grassland
1011	Trnávka	498	Other area
1013	Trnávka	265	permanent grassland
1014/1	Trnávka	110	body of water
1014/2	Trnávka	23	body of water
1049	Trnávka	199	body of water
1050	Trnávka	3 577	body of water
1058/11	Trnávka	1 277	Other area
1058/16	Trnávka	215	Other area
1065	Trnávka	156	Other area
Affected land outside DP			
land	*c.a. (Cadastral area)*	*area (m2)*	*Type of plot*
1170/3	Chvaletice	622	body of water
1170/4	Chvaletice	36 705	Other area
1170/7	Chvaletice	368	Other area
1170/8	Chvaletice	6 957	Other area
1170/9	Chvaletice	267	Other area
1170/10	Chvaletice	1 928	Other area
1170/11	Chvaletice	1 805	Other area
1170/12	Chvaletice	688	Other area
1170/15	Chvaletice	2 510	Other area
1175/2	Chvaletice	155	Other area
1176/1	Chvaletice	5 208	Other area
1180/2	Chvaletice	114	Other area
1180/8	Chvaletice	667	Other area
1180/9	Chvaletice	57	Other area

1180/10	Chvaletice	27	Other area
1180/11	Chvaletice	961	Other area
1180/12	Chvaletice	19	Other area
1180/13	Chvaletice	1	Other area
1180/14	Chvaletice	3 862	Other area
1180/15	Chvaletice	1 350	Other area
1180/16	Chvaletice	651	Other area
1180/17	Chvaletice	10 022	Other area
1180/18	Chvaletice	1 199	Other area
1180/36	Chvaletice	1 583	Other area
1180/38	Chvaletice	1 323	Other area
1180/41	Chvaletice	181	Other area
1188/3	Chvaletice	123	Other area
1217/1	Chvaletice	17 967	Other area
1217/3	Chvaletice	1 375	Other area
1218/1	Chvaletice	449	Other area
1490/2	Chvaletice	1 532	Other area
349/2	Trnávka	16 440	Other area
481/1	Trnávka	260	Other area
481/2	Trnávka	3 186	Other area
481/4	Trnávka	415	Other area
481/8	Trnávka	2 263	Other area
481/18	Trnávka	141	Other area
613/3	Trnávka	248	Other area
613/4	Trnávka	690	Other area
613/5	Trnávka	7	Other area
613/8	Trnávka	2	Other area
666/4	Trnávka	20	body of water
1050	Trnávka	36	body of water
1058/11	Trnávka	99	Other area

Table No. 5: List of land affected by the project – part of the processing plant

Land concerned - part of the processing plant			
Land - processing plant			
land	*c.a.*	*area (m2)*	*type of plot*
954/44	Chvaletice	288	Other area
954/45	Chvaletice	1 134	Other area
954/46	Chvaletice	387	Other area
954/47	Chvaletice	2 312	Other area
954/48	Chvaletice	731	Other area
954/50	Chvaletice	20 927	Other area
954/52	Chvaletice	277	Other area
954/53	Chvaletice	490	Other area

954/54	Chvaletice	279	Other area
954/55	Chvaletice	804	Other area
954/63	Chvaletice	1 967	Other area
954/64	Chvaletice	23	Other area
954/65	Chvaletice	516	Other area
954/66	Chvaletice	2 062	Other area
954/67	Chvaletice	4 812	Other area
954/70	Chvaletice	6 267	Other area
954/71	Chvaletice	6 061	Other area
954/72	Chvaletice	622	Other area
954/73	Chvaletice	27 565	Other area
954/74	Chvaletice	1 401	Other area
954/75	Chvaletice	3 391	Other area
954/76	Chvaletice	261	Other area
954/77	Chvaletice	329	Other area
954/78	Chvaletice	7	Other area
954/79	Chvaletice	19 715	Other area
954/81	Chvaletice	995	Other area
954/82	Chvaletice	6 550	Other area
954/86	Chvaletice	806	Other area
954/101	Chvaletice	6 215	Other area
954/102	Chvaletice	5	Other area
954/105	Chvaletice	420	Other area
954/106	Chvaletice	250	Other area
954/107	Chvaletice	0,05	Other area
954/116	Chvaletice	4 879	Other area
954/117	Chvaletice	3	Other area
954/126	Chvaletice	766	Other area
954/127	Chvaletice	276	Other area
954/161	Chvaletice	1 216	Other area
954/162	Chvaletice	999	Other area
954/163	Chvaletice	8 668	Other area
954/204	Chvaletice	223	Other area
954/205	Chvaletice	23	Other area
954/207	Chvaletice	92	Other area
954/216	Chvaletice	148	Other area
954/235	Chvaletice	66	Other area
954/236	Chvaletice	314	Other area
954/239	Chvaletice	32	Other area
954/270	Chvaletice	26 302	Other area
st. 495	Chvaletice	1 040	built-up area and courtyard
st. 496	Chvaletice	96	built-up area and courtyard
st. 499	Chvaletice	641	built-up area and courtyard

st. 500	Chvaletice	2 159	built-up area and courtyard
st. 501	Chvaletice	755	built-up area and courtyard
st. 502	Chvaletice	225	built-up area and courtyard
st. 503	Chvaletice	976	built-up area and courtyard
st. 504	Chvaletice	11 687	built-up area and courtyard
st. 505	Chvaletice	13	built-up area and courtyard
st. 506	Chvaletice	175	built-up area and courtyard
st. 507	Chvaletice	404	built-up area and courtyard
st. 510/1	Chvaletice	4 046	built-up area and courtyard
st. 510/2	Chvaletice	20	built-up area and courtyard
st. 511	Chvaletice	3 095	built-up area and courtyard
st. 512	Chvaletice	2 796	built-up area and courtyard
st. 537	Chvaletice	216	built-up area and courtyard
st. 538	Chvaletice	193	built-up area and courtyard
st. 539	Chvaletice	6	built-up area and courtyard
st. 540	Chvaletice	774	built-up area and courtyard
st. 541	Chvaletice	16	built-up area and courtyard
st. 542	Chvaletice	78	built-up area and courtyard
st. 543	Chvaletice	6	built-up area and courtyard
st. 556	Chvaletice	1 036	built-up area and courtyard
St. 557	Chvaletice	145	built-up area and courtyard
St. 558	Chvaletice	165	built-up area and courtyard
Land – siding			
land	*c.a.*	*area (m2)*	*type of plot*
954/44	Chvaletice	1 370	Other area
954/45	Chvaletice	525	Other area
954/47	Chvaletice	9 078	Other area
954/48	Chvaletice	4 288	Other area
954/50	Chvaletice	87	Other area
954/52	Chvaletice	8	Other area
954/78	Chvaletice	2 801	Other area
954/79	Chvaletice	1 479	Other area
954/85	Chvaletice	133	Other area
954/87	Chvaletice	2 490	Other area
954/106	Chvaletice	2	Other area
954/107	Chvaletice	141	Other area
954/117	Chvaletice	2 333	Other area
954/126	Chvaletice	1 895	Other area
954/127	Chvaletice	174	Other area
954/160	Chvaletice	1 366	Other area
954/163	Chvaletice	119	Other area
954/200	Chvaletice	873	Other area
954/204	Chvaletice	933	Other area

954/205	Chvaletice	395	Other area
954/206	Chvaletice	4	Other area
954/207	Chvaletice	287	Other area
954/209	Chvaletice	376	Other area
954/213	Chvaletice	97	Other area
954/248	Chvaletice	169	Other area
954/249	Chvaletice	75	Other area
954/257	Chvaletice	9	Other area
954/270	Chvaletice	2 655	Other area
1540/1	Chvaletice	389	Other area
1540/2	Chvaletice	933	Other area
1540/6	Chvaletice	202	Other area
1540/7	Chvaletice	8	Other area
1540/8	Chvaletice	94	Other area
1540/9	Chvaletice	2	Other area
st. 497	Chvaletice	73	built-up area and courtyard
st. 498/1	Chvaletice	676	built-up area and courtyard
st. 498/2	Chvaletice	8	built-up area and courtyard
st. 499	Chvaletice	671	built-up area and courtyard
st. 533	Chvaletice	10	built-up area and courtyard
st. 534	Chvaletice	199	built-up area and courtyard
st. 537	Chvaletice	1 533	built-up area and courtyard
st. 540	Chvaletice	42	built-up area and courtyard
st. 541	Chvaletice	409	built-up area and courtyard
St. 542	Chvaletice	5	built-up area and courtyard
St. 612	Chvaletice	559	built-up area and courtyard

4. *Nature of the project and possibility of cumulation with other projects*

Nature of the project

The plan includes the recycling and remediation of former tailings in the proposed Trnávka mining area (DP) at manganese ore deposits Chvaletice-tailings ponds 1,2 and Řečany-tailings pond 3 and the construction of a modern processing plant in accordance with the best available techniques (BAT) in the area of the existing Chvaletice industrial zone, which has the character of a brownfield.

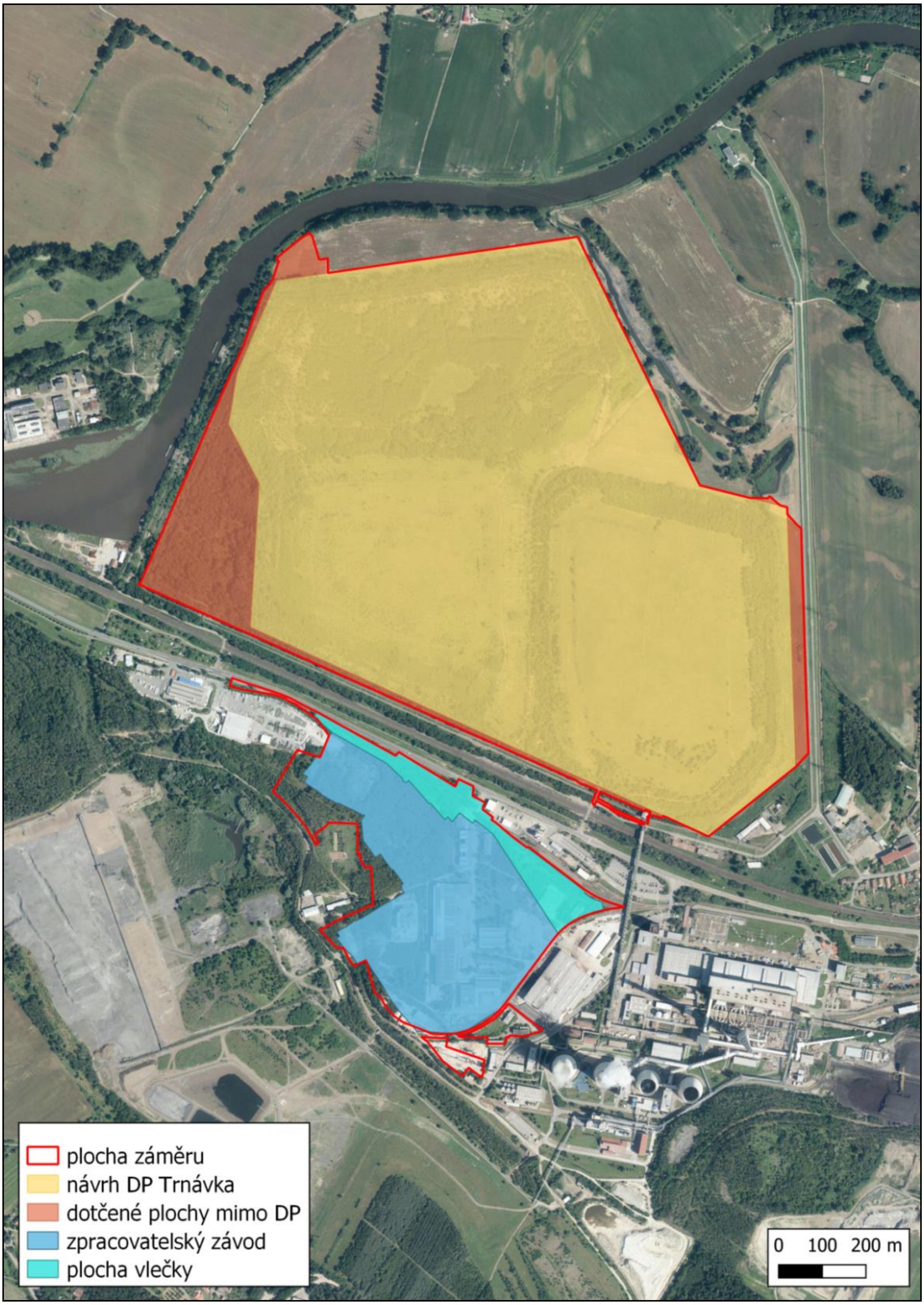
The following table and picture clearly characterize the basic areas of the project.

Table No. 6: Main areas of the project

Name of area	Area (ha)
Design of mining area Trnávka	119,35
Affected areas outside MGLs	12,45
Area of the project NORTH – mining	131,80
Processing plant	19,26
Siding area	4,01

Unused areas at the edges of the plant site	4,62
Area of the project JIH – plant	27,89
Total project area	**159,69**

Picture no. 4: Definition of individual areas of the project



Mining part of the project

The deposits Chvaletice-tailings cells 1,2 and Řečany-tailings cell 3 (hereinafter also deposits) are of anthropogenic origin. It was created by depositing waste from flotation treatment of the raw material of the Chvaletice pyrite and manganese ore deposit. The flotation sludge was gradually deposited at three tailings throughout the operation of the pyrite concentrate processing plant in 1951–1975.

Tailings cells No. 1 and 2 (Chvaletice-tailings cell deposit 1 and 2) have an area of 326,400 m2 and 393,200 m2 respectively. The average thickness of the raw material according to newly made boreholes (slopes not included) is 25.5 m (tailings pond No. 1) or 25.8 m (tailings cell No. 2). Both tailings cells were reclaimed by covering them with stony clay from the Chvaletice granite quarry (less so with other materials) and topsoil on top. The average thickness of overburden including the upper oxidized parts at tailings cell No. 1 is 1.47 m, for No. 2 it is 1.70 m. According to the drilling documentation, the thickness of the low-quality humus overburden is 0.20 – 0.21 m. The surface is grassed, with scattered shrubby vegetation, the slopes are overgrown with trees.

Tailings cell No. 3 (Řečany-tailings cell 3) with an area of 313,200 m2 was closed in approximately one third of the planned capacity and was not reclaimed. The tailings body sits on the northern edge of tailings cell No. 1. The average thickness of the raw material according to newly made boreholes (slopes not included) is 10.8 m. Grey tailings sludge is covered by a less thick layer of oxidized material and naturally formed humus in minimal thicknesses, locally the overburden is completely absent. In the southern part of the tailings there are deposits of municipal waste, tailings from the acid deposit and sieves from the granite quarry. The average overburden thickness within the whole tailings cell No. 3 is 0.95 m.

According to the currently valid mining legislation (Act No. 44/1988 on the Protection and Use of Mineral Resources and Act No. 61/1988 on Mining Activities, Explosives and the State Mining Administration), manganese ore deposits belong to the category of exclusive deposits and their extraction is classified as a mining activity. In order to permit the mining of this deposit, a decision on the determination of the mining lease must be issued by the relevant district mining authority and subsequently again by the district mining authority a mining activity permit (HČ), issued on the basis of the elaborated Opening, Preparation and Mining Plan (POPD).

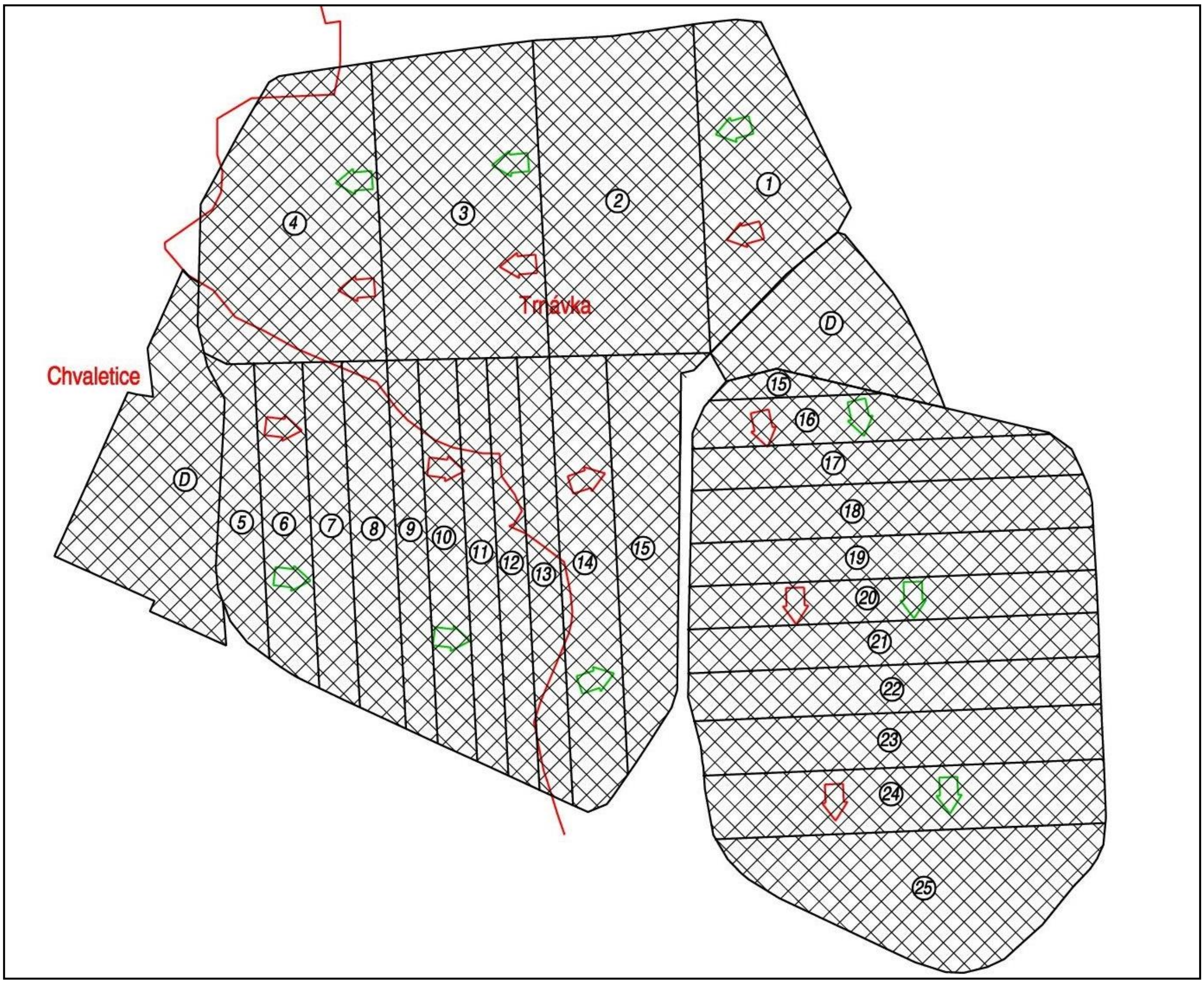
On 17 April 2018, the Ministry of the Environment issued an MŽP OVSS VI under the ref. MZP/2018/550/387-Hd ZN/MZP/2018/54 decision, granting prior consent to the submission of a proposal to determine the Trnávka mining area for mining exclusive manganese ore deposits Chvaletice-odkaliště 1,2, No. deposit 3104804, and Řečany-odkaliště 3, No. deposit 3243700, in the cadastral register. Trnávka and Chvaletice organized by MANGAN Chvaletice, s.r.o. The proposed DP lies in the protected deposit area (CHLÚ) Trnávka.

It is clear from the above picture that areas that are not currently located in the CHLÚ will also be affected in the vicinity of the proposed DT and therefore the DT cannot be determined here. The areas will be affected in particular by the construction and operation of a temporary depot behind the western edge of the DP.

Simple surface extraction of the raw material and its processing in an adjacent processing plant located south of the mining site is envisaged. Mining will begin in the eastern part of the tailings cell No. 3 and will proceed towards the west. Mining will then move to the western part of the tailings cell No. 1, with further progress from west towards east. After the completion of mining in the tailings cell No. 1, the mining will move towards the dump No. 2, where it will proceed from north to south.

Mining is planned for a period of 25 years. The following picture shows the individual annual sections according to the procedure described above.

Picture no. 5: Scheme of the process of overburdening, mining and remediation work in individual years, with a drawing of cadastral areas



Explanatory notes:

- *Numbers – years of procedure*
- *Red arrow – direction of overburden and mining*
- *Green arrow – direction of remediation progress*
- *red border – boundaries of cadastral areas (Trnávka and Chvaletice)*
- *area D – area of the dump (in the east an external deposit of mining waste and overburden materials from the mining area and in the west an overburden deposit from the plant area)*

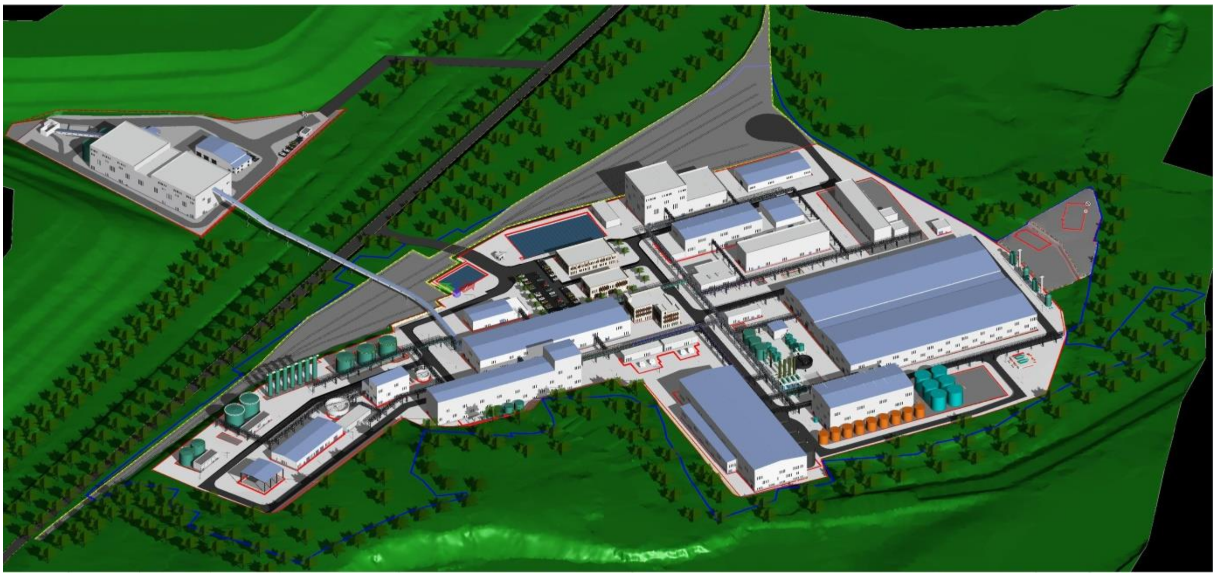
Processing plant

The raw material will be loaded by a hydraulic excavator with a backhoe bucket and transported by trucks to the pulping facility, where it will be transferred to a pulping tank. The reservoir of extracted raw material, the mining background and the pulping facility will be located in the southern part of the mining area between tailings No. 1 and 2. The pulped raw material will be transported by pipeline to a processing plant that will be built in an industrial area south of road II/322. Here it will be subjected to magnetic separation, acid leaching, purification and Mn electrowinning. The plant area will not be located in the mining area. The construction of the processing plant will be permitted within the zoning decision with the appropriate building permit. Production waste will be neutralized, washed, drained and transported back to the mining area on strips, where it will be stored as mining waste and used for remediation and land reclamation. The substrate for remediation and reclamation will be insulated and drained after extraction.

The plant is situated in the area of the existing Chvaletice industrial zone, south of road no. 322 and west of the Chvaletice power plant. At present, there are objects on the site of the future plant that are partially used. These objects will be demolished. New buildings will be built on the plant site, in which the technology for manganese extraction will be concentrated. In addition, there will be a railway siding transhipment point on the site of the processing plant, from where the products will be distributed, and the supply of large-volume chemicals to the plant will be implemented through the siding. The connection of the Mangan Chvaletice s.r.o. yard to the siding of the Chvaletice Power Plant is designed in the place of the existing track 1. The siding tracks are designed as handling, i.e. with operation in the form of shunting and its control by marshalling signals. It includes transhipment equipment for handling and bottling raw materials.

Traffic intensity on the railway siding is expected to be 1 train/day. The connection to the railway line Prague – Česká Třebová will remain the existing, i.e. at railway station Recany nad Labem. In terms of car transport, the processing plant will be connected to road II/322.

Picture no. 6: Visualization of the processing plant and quarry facilities



Mining waste disposal and land reclamation

At the same time, the intention to use manganese ore can be perceived as an intention to recycle mining waste and remediate the tailings. The construction and method of securing tailings corresponds to the practices and technical possibilities at the time of their creation but no longer meets today's requirements for securing mining waste storage sites. The problem is mainly the leaching of pollutants into the subsoil, groundwater and the Elbe River, as well as the carrying away of the tailing’s material by wind and water erosion. Laboratory analyses carried out between 2015 and 2017 showed high and above-limit levels of manganese in particular, but also other substances (Mg, Fe, Ca, NH_4 and SO_4) in groundwater and surface water throughout the site, including domestic wells in the nearest village of Trnávka. Details of current contamination are provided in Part C and impacts on groundwater and surface water in Part D of this dossier.

The proposals for the reclamation of the area after the recovery and recycling of all stocks of the Chvaletice tailings are primarily based on the proposed technological process of manganese extraction. The content of the raw material is about 6%. As part of the recycling of the tailings, all the material of the tailings will be gradually removed, but after the utility component is removed, neutralized and stabilized, it will be returned to the remediated area. Apart from manganese, the deposits do not contain any useful components in significant quantities. The method of material recovery assumes a slightly larger volume of material from the new repository than for the current tailings. At the same time, a modern method of securing the territory and reclamation will be carried out, allowing further use in accordance with the requirements of the surrounding municipalities and the interests of nature, landscape and public health protection. The material deposited back will be classified as mining waste and will therefore be handled in accordance with legislation, i.e. in particular Act No. 157/2009 Coll., on Mining Waste, as amended, and related regulations. This activity will be subject to the supervision of the State Mining Administration.

Cumulation of effects

This chapter, although included at the beginning of the text according to the legal structure of the documentation, is based on the identification and assessment of the environmental impacts of the project (see Chapter D of this documentation). And when evaluating each influence, eventual accumulation is taken into account. That chapter therefore constitutes a relevant summary of the whole of Chapter D.

The accumulation of environmental effects is considered in terms of:

1) spatial – determination of the territory in which the occurrence of influences is considered,

The territory in which the accumulation of influences is assessed is determined by the potential extent of those influences related to the implementation of the project, the extent of which is such that it exceeds the boundaries of the mining area and the immediate surroundings.

2) time – determination of the time horizon for the occurrence of influences,

Some influences act immediately, others with a long-term delay. As an example, we can mention the short-term, immediate effect of overburden work on fauna and flora, at the other end of the imaginary scale there is, for example, the impact of reclamation after mining on the landscape, which will become apparent many years after mining (the growth of new greenery). The time aspect for considering cumulation is therefore determined by at least the duration of the implementation of the plan plus the time necessary for the implementation of remediation and reclamation. We can talk about the horizon of decades.

3) significance of effects – determination of significance for which it makes sense to consider cumulation.

The accumulation of influences is considered for those influences whose occurrence is expected in connection with the implementation of the project (i.e. influences that have been identified and are also considered potentially significant).

The following companies have their operations in the immediate vicinity of the proposed plant within the Chvaletice industrial zone:

- *KASI FOUNDRY a.s.*, production of sewerage cast iron, new foundry, new plant (start of production 2019) located east of the proposed processing plant.
- *Obalovna Chvaletice a.s.*, production of coated asphalt mixtures, new plant (start of production 2019) located north of the proposed processing plant.
- *Pavlis and Hartmann, spol. s.r.o.*, production of fire hoses on looms, existing plant located north of the proposed processing plant.
- *ZAPA beton a.s.*, concrete production, plant located south of the proposed processing plant.

In addition, the following are operated in the industrial zone:

- Concrete plant *TIBA BETON CZ, s.r.o.*, production of concrete and reinforced concrete pipes, existing plant located west of the proposed processing plant.
- *Elektrárna Chvaletice a.s.*, power and heat generation, lignite fuel, east of the proposed processing plant.
- *GRANITA Lomy s.r.o.*, quarry, mining of biotite granite, southeast of the village Hornická čtvrť.
- *KAMENOLOMY CR s.r.o.*, Zdechovice quarry, mining of biotite granite west of the village Zdechovice.
- *Bohemian Waste Management a.s.*, landfill Zdechovice, comprehensive services in the field of waste.

As a source for information on planned projects that may have a significant impact on the environment and public health, the EIA Information System can be used, which is practically the only publicly available information source on these activities. Below are the individual intentions.

<u>Intention code: OV6283</u>
Name of the project: Waste stabilization BOME - Chvaletice in the area of Galmet Trade, s.r.o.
Competent authority: MoE
Classification: I/53
Status: Dissenting opinion
Date of publication of the opinion: 5.4.2023
Location of the project: Pardubice Region, municipality of Chvaletice, Zdechovice
Characteristics: It is a facility to which mercury-containing waste/mercury waste is to be received in order to stabilize liquid mercury to form an inert substance meeting the requirements for permanent storage of mercury
Possibility of cumulation: The revised documentation is not made public. With regard to the return of the documentation for reasons that call into question not only the impact assessment, but also the technical, technological and temporal aspects of the project, it is not possible to objectively evaluate the cumulation. It is not clear whether the plan will be implemented and with what parameters and influences. However, it is a project with a short duration, the implementation of which, according to the information in the documentation, should be completed before the start of operation of the assessed project. Therefore, the cumulation would not take place due to time constraints. Furthermore, it is not a project with a large volume of induced traffic (2 trucks per week), so there would be

no cumulation in terms of the effects associated with traffic on public roads. More significant impacts of this project may be associated with emissions of Hg, SO_2 and volatile organic compounds (imission concentrations are, however, very low according to the documentation), which are pollutants that are not produced by the Recycling of the Chvaletice – Trnávka Tailings Pond. For the above reasons, the cumulation (even in the case of possible concurrence) is considered insignificant.

Intent code: OV6276
Name of the intent: Waste stabilization BOME - Chvaletice in the area of Galmet Trade, s.r.o.
Competent authority: Ministry of the Environment
Classification: I/53
Status: Dissenting opinion
Opinion publication date:4.11.2022
Location: Pardubice Region, Chvaletice, Zdechovice
Characteristics: This is a facility to which mercury-containing waste/mercury waste should be received in order to stabilize liquid mercury to form an inert substance meeting the requirements for permanent mercury storage
Possibility of cumulation: In view of the dissenting opinion, cumulation does not need to be considered. See above for a similar intention.

Intent Code: PAK 942
Project: Extension of the facilities of the Centre for Comprehensive Waste Management Zdechovice
Competent authority: Regional Authority of the Pardubice Region
Classification: II/56
Status: Not subject to further assessment
Date of publication ZZŘ:3.6.2022
Location of the project: Pardubice Region, municipality of Chvaletice, Zdechovice
Description: The intention is to expand the premises of the Centre for Complex Waste Management Zdechovice (hereinafter referred to as "CKNO") by additional areas for waste management, immediately adjacent to the CKNO premises, and at the same time to increase the capacity of the landfill body. The extension of the CKNO is considered on an area of about 100,000 m2. In total, the capacity of the deposited waste will increase by 2,400,000 m3. The selected landfill capacity of 160,000 tons of disposed of waste/year will not be increased.
Possibility of cumulation: The implementation of the plan will not increase the capacity of the project. The effects associated with the continuation of operations will not change with the extension of the service life. Relevant impacts of the current operation of CKNO in terms of cumulation (i.e. especially impacts on air quality and impacts on the noise situation are) part of the considered current environmental load. The partial displacement of the project area is not significant in the context of its effects and the overall load on the area. The project will not generate new effects for which cumulation would not be taken into account.

Intent Code: PAK 887
Project title: Deepening of the Zdechovice quarry and mining of balance reserves
Competent authority: Regional Authority of the Pardubice Region

Classification: II/79
Status: Not subject to further assessment
Date of entry into force of the ZZŘ: 4.3.2021
Location of the project: Pardubice Region, municipality of Chvaletice, Zdechovice
Characteristics: The subject of the project is the extraction of aggregates in the existing Zdechovice mining area, including the deepening of the entire mining area by 15 m from the permitted level of 220 m above sea level to the elevation of 205 m above sea level. The method of extraction, the treatment of the extracted raw material and the expedition routes will remain unchanged. The change will be made by the transfer of technology in the final phase of mining, when the stationary technological line will be replaced by mobile technology.
Possibility of cumulation: The total service life of the quarry will be extended by 11 years with a total annual extraction capacity of 260,000 t. The implementation of the plan will not increase the mining capacity. The effects associated with the continuation of mining will not change with the extension of the service life. The relevant impacts of the current quarry operation in terms of accumulation (i.e. in particular the effects on air quality and the noise situation) are part of the considered current environmental load in the area. This intention will not generate new effects for which cumulation would not be taken into account.

Intent Code: PAK 756
Project Name: Modernization of road II/322 from the crosses. s III/3224 for the new Kojice bypass, Modernization of road II/322 Kojice - bypass, Modernization of road II/322 Chvaletice - Kojice
Competent authority: Regional Authority of the Pardubice Region
Classification: II/9.1
Status: Not subject to further assessment
Date of entry into force of the ZZŘ: 18.6.2017
Location of the project: Pardubice Region, municipality of Chvaletice, Kojice
Characteristics: The project solves the modernization of road II/322 in the vicinity of the village Kojice. The modernization is solved by three constructions that follow each other (Modernization of road II/322 from cross. with III/3224 to the new bypass of Kojice, Modernization of road II/322 Kojice - bypass, Modernization of road II/322 Chvaletice - Kojice).
Possibility of cumulation: This is a relocation of road II/322. The road will be displaced from the centre of Kojice to the northern edge of the urban area to the concurrence with the railway line No. 010. This is the main access road to the project from the west side. Construction is under construction with completion in spring 2023. From the point of view of cumulation with the project under consideration, there can be no concurrence of implementations in time, nor can cumulative effects be assumed due to the distance between the two projects. After implementation, this plan will reduce the potential negative impacts of the assessed project, because road transport associated with the mining and processing of manganese ore will not pass through the centre of Kojice.

Intent Code: PAK 723
Name of the project: Production plant - Foundry KASI Chvaletice (Chvaletice industrial zone)
Competent authority: Regional Authority of the Pardubice Region

Classification: II/4.1;II/4.2;II/10.4
Status: Not subject to further assessment
Date of entry into force of the ZZŘ: 24.3.2016
Location of the project: Pardubice Region, municipality of Chvaletice
Description: The intention is to build a new industrial production plant of the KASI Chvaletice foundry for the production of waterproof and odor-tight covers, innovated line drainage and sewer cast iron with surface treatment.
Possibility of cumulation: Construction completed; operation started in 2019. The possibility of cumulation is taken into account in relevant expert studies. In particular, this concerns cumulation in terms of noise, traffic and air quality. The noise level of the equipment was determined during noise measurements in 2021 and 2022, the immission load of the territory by the foundry was added to the results of the dispersion study.

<u>Intent Code: PAK 708</u>
Name of project: Asphalt plant Chvaletice
Competent authority: Regional Authority of the Pardubice Region
Classification: II/6.5
Status: Not subject to further assessment
Date of entry into force of the ZZŘ: 19.1.2016
Location of the project: Pardubice Region, municipality of Chvaletice, municipality of Trnávka
Characteristics: It is a bituminous mixture mixing plant BENNINGHOVEN TBA 3000 UC with a theoretical annual output of 100000 t of coated mixture and a maximum output of 240 t/hour of coated mixture.
Possibility of cumulation: Construction completed; operation started in 2019. The possibility of cumulation is taken into account in relevant expert studies. In particular, this concerns cumulation in terms of noise, traffic and air quality. The noise level of the equipment was determined during noise measurements in 2021 and 2022, the immission load of the area by the asphalt plant was added to the results of the dispersion study.

<u>Intent Code: OV6165</u>
Project title: Construction of a line for mechanical-biological treatment of waste - Zdechovice
Competent authority: MoE OVSS VI
Classification: I/10.1; I/10.2
Status: Affirmative binding opinion
Date of publication: 23.5.2016
Location of the project: Pardubice Region, municipality of Chvaletice, municipality of Zdechovice
Description: The subject of the plan is the extension of other waste management methods on the premises of the Centre for Comprehensive Waste Management Zdechovice. It is the construction of a line for mechanical and biological treatment of other waste, which processes 120,000 tons of other waste per year. The new technologies will be used to treat most of the waste currently accepted for landfilling, so that it can be further used, both materially and energetically.
Possibility of cumulation: The project has a building permit, but not yet implemented., The possibility of implementation according to the information from its

developer uncertain. The influences of the intention are very local. Given the location of the project and the nature and significance of its effects, significant cumulation cannot be assumed,

<u>Intent Code: PAK816</u>
Name of project: CKNO Zdechovice - Sludge dryer with energy block
Competent authority: Regional Authority of the Pardubice Region
Classification: II/56
Status: Not subject to further assessment
Date of publication of the ZZR: 22.8.2018
Date of entry into force of the ZZŘ: not stated
Location of the project: Pardubice Region, municipality of Chvaletice, municipality of Trnávka
Characteristics: The intention is to place the technology for processing centrifuged sludge and its energy recovery. For this purpose, a technology based on drying and subsequent combustion at high temperature will be built. The technology will be a source of heat and electricity. The incineration process will produce ash, which will be used as an additive to compost on the premises of CKNO.
Possibility of cumulation: According to the information provided by its developer, the project does not have any decision in the follow-up proceedings. Given the location of the project and the nature and significance of its effects, significant cumulation cannot be assumed,

The issue of cumulation with existing plants and those not mentioned above is addressed in relevant expert studies, i.e. mainly in noise and dispersion studies. In particular, noise study authors have very accurate and detailed data on all noise sources in the territory.

The cumulation of effects can be considered in the case of the transport of raw materials, when the effects caused by freight transport of products and raw materials will be cumulated with the effects from other transport caused by other users of public roads (users of passenger cars, carriers). The cumulation of effects associated with transport is taken into account in the acoustic and air pollution assessment of the project, when other road traffic is also considered. The basis for this cumulation, including the situation in the longer term, is given in the traffic study, which is Annex No. 9 to this documentation.

5. *Justification for the location of the project and description of the options considered by the developer, stating the main reasons for choosing the solution, including a comparison of the environmental impacts*

Justification for the location of the project

The main reason for placing the project at the site is the accumulation of the raw material – manganese ore. It is a deposit of a reserved mineral, for its extraction it is necessary to determine the mining area. The deposit is inherently non-movable, and its extraction must therefore take place in the given locality. It is not typical for this type of economic activity that the deposits are of anthropogenic origin.

Another reason is the fact that it is a burden of anthropogenic origin, potentially threatening components of the environment.

The intention to use the deposits of sludge deposits from the former tailings of Manganorudné a kyzové závody, n.p. Chvaletice, is focused on the production of high-purity electrolytic metal manganese and high-purity manganese sulphate monohydrate without the use of selenium and chromium. The production is two-stage, in the first stage metallic manganese is produced (represents about 30% of production), in the second stage part of the produced metal manganese is processed into manganese sulphate (represents about 70% of production).

For the Czech Republic, but also for the whole of Europe, this is an opportunity to proceed in accordance with the Green Deal, which aims to accelerate the decarbonization of the whole of Europe and meet the principles of the circular economy. The implementation *of the "Recycling of the Chvaletice-Trnávka tailings*" will guarantee a certain degree of self-sufficiency in the supply of high-purity manganese products and thus reduce the carbon footprint of their production and transport from China, where more than 90% of manganese suitable for electric vehicle batteries is currently imported.

Lithium-ion batteries for electric vehicles are based on NMC (nickel-manganese-cobalt) chemistry. Along with nickel, lithium and cobalt, manganese is one of the key elements for their production. With the development of sustainable energy sources and electromobility, the demand for manganese is growing significantly. Especially in this area there is potential and opportunity for effective and meaningful use of the Chvaletice deposit.

According to qualified estimates, the planned capacity of lithium-ion batteries in Europe will increase several times by 2030 to around 1,400 GWh, most of which will be manganese. High-purity manganese products in the form of manganese sulphate and metallic electrolytic manganese will be supplied by MANGAN Chvaletice, s.r.o. to manufacturers of electric vehicles, batteries and materials for active cathodes primarily in Europe. The European market is the fastest growing market for high-purity manganese.

The aim of the investor is to become the main supplier of high-purity manganese products to the European electric vehicle market and to provide customers with products of the highest quality, traceable origin, produced without ethical compromise. This will contribute to Europe's raw material self-sufficiency in a key period of structural changes in the European energy sector. The strategic importance of the project is also illustrated by the support from the European Commission and the acquisition of capital investment from the European Bank for Reconstruction and Development (EBRD) to ensure the preparation of the project.

Production plant of MANGAN Chvaletice, s.ro. will also become the only high-purity manganese plant in Europe to source and process the raw material at the same site.

The proposed area of the DP lies in the protected deposit area (CHLÚ) Trnávka (71048). The total area of CHLÚ Trnávka is the same as the area of the proposed DP, ie 1.193475 km^2. The area of our own exclusive deposits is approximately 86.73 ha.

On 17.4.2018, the Ministry of the Environment issued an MŽP OVSS VI under the ref. MZP/2018/550/387-Hd ZN/MZP/2018/54 decision, granting prior consent (PS) to submit a proposal to determine the Trnávka mining area for mining exclusive manganese ore deposits Chvaletice – tailings ponds 1,2, deposit no. 3104804, and Řečany – tailings pond 3, deposit no. 3243700, in the cadastral register. Trnávka and Chvaletice organized by MANGAN Chvaletice, s.r.o.

The DP is designed to include entire deposits and other areas needed for mining and related activities (tailings slopes, areas for handling raw materials and storing waste material from treatment, transport, etc.).

The location of the production plant is based on the location of the current industrial zone, which has the character of a predominantly brownfield in the used part. The main advantage of the proposed location of the processing plant is its proximity to the tailings area and the possibility of connecting both parts with a technological bridge.

Description of the options considered by the investor

The localization of the project is based on the location of the mineral deposit. From this point of view, the position of the project is therefore invariant within the area of the exclusive deposit.

The specific intention to mine the deposit is based on the developer's request and is defined by the location of the deposit itself, specific property relations and potential conflicts of interest, whether in the area of technical and transport infrastructure, as well as with regard to the potential impacts of the project on the environment and public health. The plan respects the requirement of the Ministry of the Environment to issue opinions on mining plans for a period of approximately 20 years (see above).

The intention is therefore designed in one variant.

When assessing the environmental impacts of a project, two options are also considered, namely the project variant – which counts on the implementation of the plan and the zero variant – in which the plan will not be implemented.

The zero variant (variant V0) is the reference variant (not the design variant). It describes the situation in the event that the mining lease and the mining activity permit are not determined in the manner described in the project variant and the deposit will not be mined. The variant serves to compare the impacts related to the implementation of the project (noise, air pollution, traffic, landscape character, etc.), respectively to determine their qualitative and quantitative differences and to evaluate the overall significance of the impacts of the project variant.

The project variant (VP variant) describes the state when the plan is implemented. Mining will take place with the course of implementation and technological solution described below. The description of the project variant including inputs and outputs is given in the relevant chapters of Part B of this text.

When processing the EIA notification, the following two subvariants were taken into account, where the method of transport and storage of waste material after mining and the method of remediation and reclamation were further addressed.

Sub-variants with regard to the re-transport of mining waste:

A. trucks

B. belt conveyor to the final place of deposit of mining waste

Subvariants in terms of remediation and reclamation:

Y1. Creation of a body of water in the central part of the territory

R2. Remediation and reclamation without this water area

Subvariant B is no longer considered in this EIA documentation. Similarly, the method of remediation and reclamation is no longer an option. The proposal for remediation and reclamation of the territory is a combination of variants R1 and R2, which aims to support the formation of wetland communities and rainwater retention in the territory. From the first variant, the dam was preserved, which had the task of creating a permanent water area in the central part of the territory. The currently designed dam is with a lower outlet and the central depression will serve as a dry polder that will retain torrential rainfall and gradually drain it. The concept of arranging the valley floor is then taken from the second variant – when a smaller recess below ground level (0.5 – 1 m) was created as part of technical reclamation around the channel draining rainwater leading through the central depression in the south-west direction to the dam. The formation of shallower depressions creates periodically flooded pools retaining rainwater in the area. This will allow the emergence of hygrophilous or wetland communities with the assumption of support of especially amphibious animals.

6. *Description of the technical and technological solution of the project, including any demolition work necessary for the implementation of the project; in the case of projects falling under the regime of the Act on Integrated Prevention, including a comparison with the best available techniques, associated emission levels and other parameters*

Due to the scope of the chapter, its brief content is given below. This Chapter B.I.6. It is further divided into 4 basic parts, which are further divided into individual subchapters as needed:

a) Mining part

- *Basic characteristics of individual technological units*
- *Detailed description of individual activities*

b) Quarry facilities

- *Description of facilities*
- *Method of operation in the background*
- *Time pools and shifts in mining*
- *Construction of quarry facilities*

(c) Processing plant

- *Basic description of the processing plant premises*
- *List of structures*
- *Technological process of production of electrolytic manganese metal (EMM) and manganese sulphate monohydrate (MSM)*
- *Time funds and shifts in part of the plant*
- *Construction of a processing plant*

(d) Comparison with best available techniques (BAT)

a) Mining part

The proposal for mining and remediation of deposits is based on the Feasibility Study and the update of the mining study. From the technological point of view, the assessed project consists of the technological units described below. Details of individual activities are then given in the next subchapter.(Johns, a další, 2022) (Ječný, 2022)

Basic characteristics of main technological units

1) Construction of a temporary external deposit

Before the start of mining, a temporary deposit of overburden material from the plant construction area will be built in the western part of the area of interest (on the western side of mining block No. 1, outside the proposed Trnávka DP). Its maximum disposable volume will be approximately 777,500 m3 and the area of approximately 62,160 m2. It will be built in footbridges. Its slope will be 1:2 to 1:2.5 andmaximum height is 15 m. This temporary deposit will be fully processed during the lifetime of the project. The material from it will be continuously used for remediation work directly in the DP. This will eliminate the import of soils for overburden by road transport, which was considered in the notification of the intention for the screening procedure. Details of this deposit are given below in the text, including part of the construction of the plant.

Picture no. 7: Temporary deposit of overburden material from the plant construction area

Explanatory notes:

- *beige area – dump area (in the west there is a deposit of overburden materials from the plant area)*
- *light grey colour – current state of the terrain*

2) Removal of woody plants

Trees (mainly shrubs and stands of the character of rods) will be removed during the period of dormancy. The area of the removed trees will approximately correspond to the harvesting progress for the following year (until the next period of dormancy). This cycle will be repeated. The wood mass will be chipped on site (there are almost no trees in the area that could be used on the timber market). The resulting wood chips will be used as a source of organic matter for reclamation. The produced wood chips will be temporarily stored directly in the reclamation area or in the inter-deposit area of overburden materials.

3) Overburden work

Overburden of topsoil and subsoil and its separate deposit on deposits or on the site of ongoing technical reclamation

Overburden work will be carried out well in advance of the mining work due to the need to prepare the area for mining.

Overburden of the upper humic layers and the lower non-humic layer will be performed separately.

Overburden and mining waste from the quarry opening (i.e. from the initial phase of mining and processing of the raw material) will be deposited in an external deposit in the eastern part of the territory in the mining area. This is the area between the east side of mining block 3 and the north side of mining block 2. This depot will have a capacity of 273,000 m3. This deposit will free up space for further deposits on the already excavated area.

Materials from overburden will be transported mainly directly to the place of final disposal for remediation and reclamation of the area, i.e. they will be overlaid with the top insulation of the dump of the deposited material after ore (mining waste) treatment. If, in the given period, the amount of overburden material obtained exceeds the need for material for the unfinished area of remediation and reclamation, the material will be stored in the inter-depot. The material from the inter-deposit will be used in cases where the amount of overburden material is not sufficient for the remediation and reclamation of the unfinished area of the repository. The remediation and reclamation of the repository is planned in such a way that after completion of the works, there will be no material left for the intermediate deposit.

4) Mining work
- mining activities, extraction of raw materials in footbridges

Mining work will be carried out on footbridges from the bottom up with a gradual gravitational drainage system of channels and pits. The minimum working distance of individual mining cuts will be 12 m. Cutting inclination 45° and height from 3 m to 2 m.

5) Preparatory work for the disposal of mining waste
- comparison of the basis for the disposal of mining waste,
- Loading of base layers: aggregates, certified recyclate from the demolition of an industrial plant, geotextiles, insulating layer, certified insulating material, drainage system

The area for the storage of mining waste will be prepared continuously with the termination of mining on the last mining footbridge.

6) Disposal of mining waste

Mining waste will be deposited in layers (dumper by trucks), the material will be spread by a dozer and compacted with a roller.

7) Technical reclamation of the territory

The resulting shape of the dumps will be gradually shaped by depositing mining waste and treated by a dozer. On the sides and on the surface, the hoppers will be layered:
- insulation layer, certified insulation material,
- geotextiles,
- top layer of dump, clay fill and fertilizable layers.

The surface of the dumps will be gravitationally drained into a natural micro-basin with a central retention area, a dry polder. Water at the outer edges of the dumps will naturally be drained into ditches. Ditches will be built around the perimeter of the dumps.

Humic soil from overburden will be brought to the surface of the dumps, which will be evenly distributed and leveled.

8) Biological reclamation of the territory

Biological reclamation will aim at biological revitalisation of the remediated areas so that they can be handed over for subsequent use. A combination of natural and recreational functions is envisaged.

Detailed description of individual activities

1. Opening and preparation, direction of mining progress

The mining area is divided into three separate units. On the north side it is the tailings cell No. 3, on the southwest side it is the tailings cell No. 1 and on the southeast side it is the tailings cell No. 2. In the following text, the equivalent term mining block is also used for tailings, if it concerns their extraction.

The depots were created as tailings by depositing waste from flotation treatment of the raw material of the Chvaletice pyrite and manganese ore deposit. The flotation sludge was gradually deposited at three tailings throughout the operation of the processing plant for the production of pyrite concentrate in the years 1951–1975.

Before the actual opening of the deposit, the area for the repository in the eastern part will be prepared. This area is located in the triangle between tailings No. 2 and 3 and the north-eastern boundary of the DP. At present, it is mainly an agriculturally managed area, plot No. 662/1 in the cadastral area. Trnávka is registered in the Land Register as an agricultural land fund (ZPF). Therefore, before the start of implementation, this land must be permanently withdrawn from the ZPF. Topsoil and any subsoil from this area will be segregated separately and placed on the deposit in the peripheral part of this area or on the deposit west of the DP. The intention of the investor is to use topsoil and subsoil for reclamation work. This intention requires the approval of the ZPF protection authority.

Mining will begin in the eastern part of cell 3 and will proceed towards the west. Mining will then move to the western part of cell 1. Subsequently, the advance will be within cell 1, from west to east. After the end of mining in cell 1, mining will move towards cell 2, where it will proceed from north to south. The thickness of cell 3 is the smallest (compared to other depots, about 12 m). The smaller thickness of the tailings cell 3 means faster mining progress and, as a result, faster clearing of land for the construction of the repository. Tailings cell No. 3 will be excavated during the first four years. The remaining tailings are higher and thus the mining progress will be slower.

2. Overburden work

Overburden work will be carried out technically in the same way as mining work, with small overburden thicknesses it is possible to use a dozer. The direction of the progress of overburden work will be identical to the progress of mining work. It will be ensured about a year in advance of the overburden work before the mining works.

The dozer rolls up the overburden on a mound, which is then loaded with an excavator onto a truck (dumper) that transports the overburden to the place of storage.

The deposits themselves consist of 3 different horizons:

1) overburden containing humus,
2) overburden other,
3) raw material.

Separately, the hiding of the humus horizon will be removed in those places where this horizon is located. This applies in particular to tailings No 1 and 2. At the tailings cell No. 3, this horizon is only discontinuous.

At tailings cell No. 3, the humus layer will be overlaid in places where this layer is thick enough to be separated from the raw material (tailings cell No. 3 was not mostly covered by overburden after the closure of its activities).

At tailings cells No. 1 and 2, the humic layer will also be removed separately, the beginning of these works will be in the 4-5th year of mining before the transition to this part of the deposit. Humic materials will then be deposited at the place of final storage for remediation and reclamation. The thickness of the humic layer is approximately 0.05 – 0.13 m according to the individual tailings.

Overburden of humic layers at the tailings will be carried out by a set of working machines (dozer, excavator or loader) and the required number of trucks (dumpers) in one daily shift will average only a few days a year. Machines that perform mining and transport of raw material on normal days will be used. Therefore, there will be no increase in traffic or the number of mechanizations on overburden days.

Overburden will be directly deposited on the area of the ongoing redevelopment. In the first years of mining, when the space for overburden will not be ready for the area of ongoing remediation, the overburden (subsoil and topsoil) will be deposited separately on the outer dump (external deposit). Subsequently, they will be used for the redevelopment of other areas.

Woody vegetation will always be removed before overburden is made. With regard to the protection of birds (§5a of Act No. 114/1992 Coll.), the removal of trees and overburden of the upper layer will be carried out only in the non-nesting period and in the period of dormancy, i.e. from October to March. The wood mass will be chipped and used for the reclamation of the repository.

Part of the opening work is also the rest of the overburden, i.e. the removal of non-humic material covering the tailings or forming its slopes. Tailings cell No. 1 and 2 contain mainly stony clay from the Chvaletice granite quarry in the thickness of 1.47 m (tailings cell No. 1) and 1.70 m (tailings cell No. 2), but the occurrence of other materials of soil and stone character is also possible. In the case of tailings cell No. 3, the overburden was calculated on average at 0.95 m, but it is made up of several different types of material and in some parts it is not found at all. Before overburden is carried out at these tailings, a more detailed sampling will be carried out and if material that could not be suitably used for reclamation is found, this material will be classified according to the waste catalogue and handed over to the authorized person as waste for disposal or use.

Overburden of non-humic layers will be carried out by a set of working machines (dozer, excavator and the required number of trucks (dumper)) in one-to-two-day shifts. Machines that perform mining and transport of raw material on normal days will be used. The reserve for overburden work is already calculated in machine operating hours and fuel consumption. Therefore, there will be no increase in traffic or the number of mechanizations on days with overburden (see below). With small overburden thicknesses, it is also possible to use a dozer. The dozer rolls up the overburden on a mound, which is then loaded onto a truck (dumper) using an excavator, which transports the overburden to a place of temporary or permanent storage.

The total volume of overburden is approximately 1,222 thousand m3. The number of days with overburden work will be variable. On average, it will be necessary to relocate about 50,000 m3 of overburden annually (in a year with a maximum overburden of up to 80,000 m3, with a minimum overburden of 11,000 m3). The theoretical daily output of overburden may be equal to the expected daily extraction (all mechanization would perform only overburdening) or even slightly exceeded it, due to the shorter transport distances of these materials. The daily output of overburden will be around 2500 t, the number of days with overburden is then based on an average of 50 days a year (range according to the amount of overburden and capacity possibilities of about 10 – 60 days a year). The following table clearly shows the amount of overburden handled in each year.

Table No. 7: Overview of the amount of overburden handled

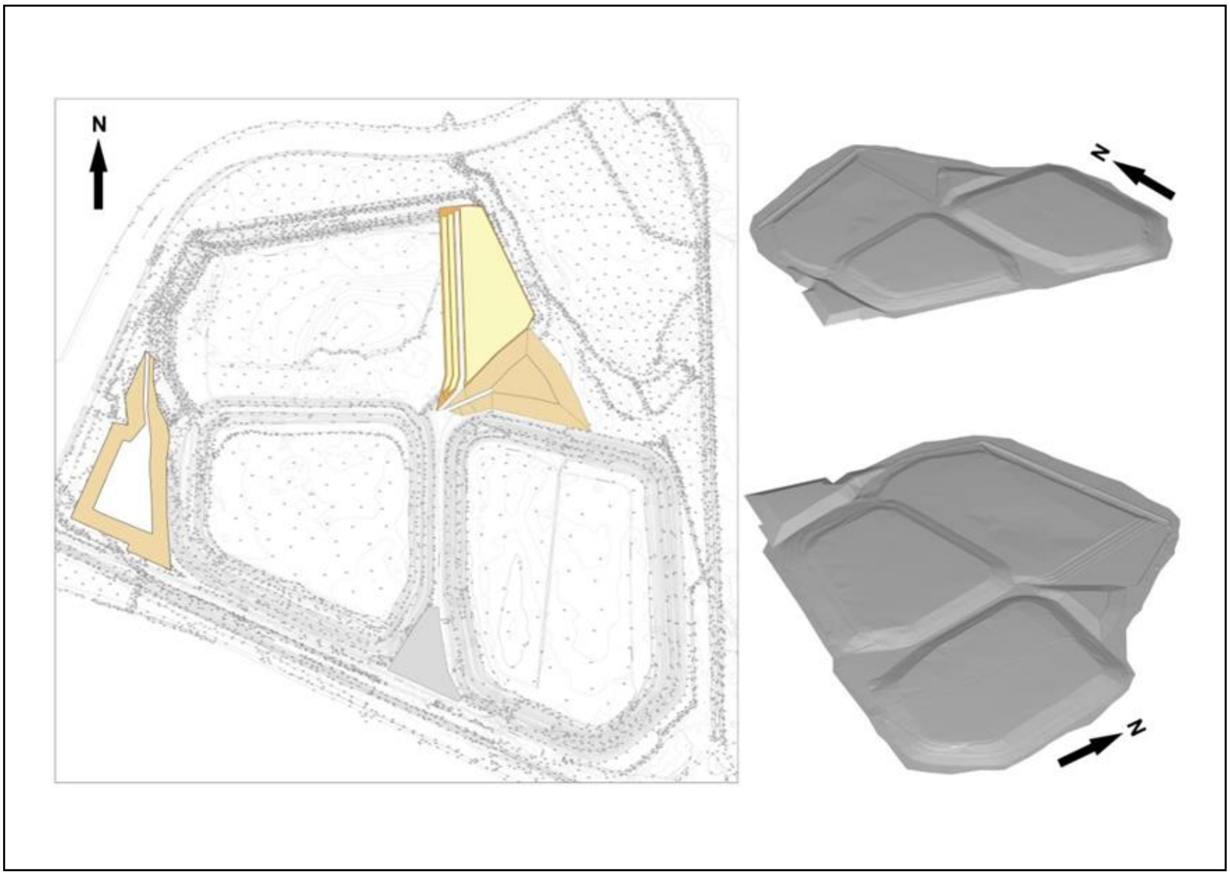
Year	Overburden		
	m3/year	**t/year, wet**	**max. t/day wet**
-1	0	0	0
0	0	0	0
1	38 373	69 071	2 500
2	44 663	80 394	2 500
3	48 018	86 433	2 500
4	36 276	65 296	2 500
5	80 483	144 869	2 500
6	57 758	103 965	2 500
7	69 120	124 417	2 500
8	59 652	107 373	2 500
9	42 608	76 695	2 500
10	50 183	90 330	2 500
11	48 290	86 921	2 500
12	35 980	64 765	2 500
13	18 937	34 087	2 500
14	11 362	20 452	2 500
15	11 362	20 452	2 500
16	73 713	132 683	2 500
17	51 427	92 569	2 500
18	51 427	92 569	2 500
19	61 713	111 083	2 500
20	52 285	94 112	2 500
21	51 427	92 569	2 500
22	52 285	94 112	2 500
23	61 713	111 083	2 500
24	54 856	98 741	2 500
25	58 284	104 912	2 500
Total	**1 222 197**	**2 199 954**	
Maximum / year	***80 483***	***144 869***	

3. *Mining*

Mining procedure

The mining process will be smooth and planned for a period of approximately 25 years. The first mining block 3, due to its current height, will be mined during the first four years (following 2 pictures). The remaining mining blocks 1 and 2 are higher and the mining progress will be slower (more pictures).

Picture no. 8: Mining process after the 1st year



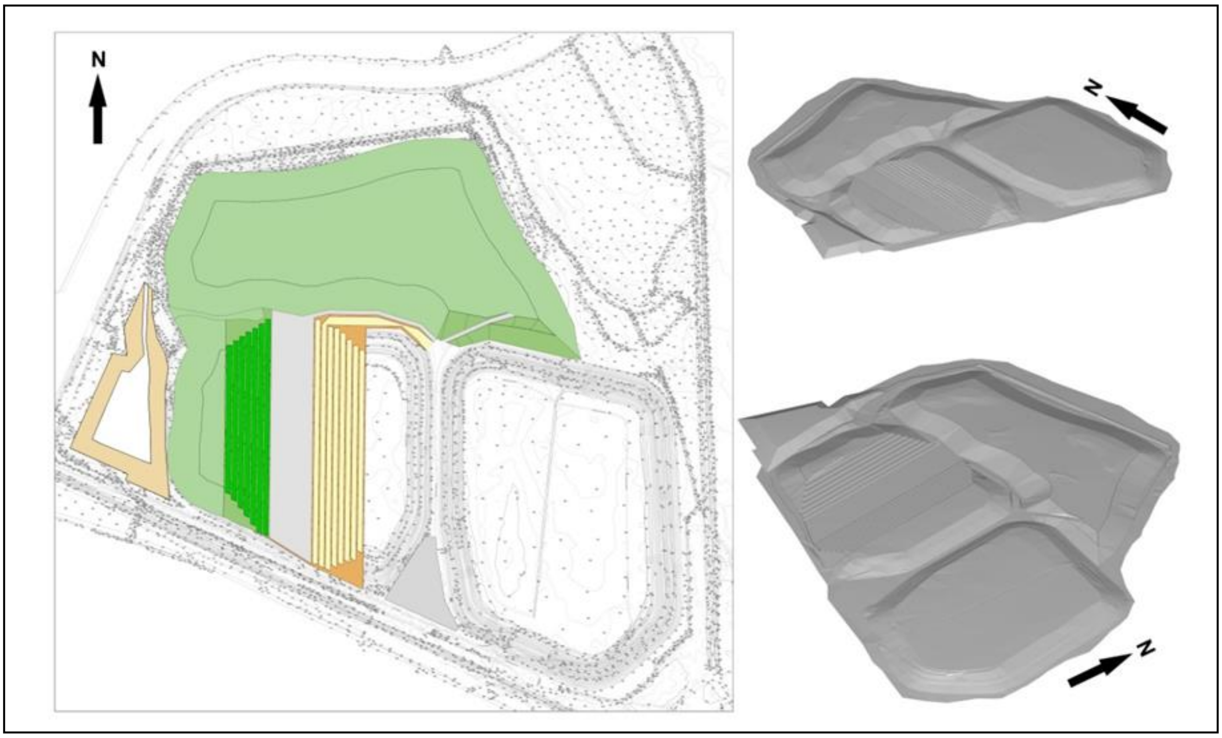
Explanatory notes:

- *yellow area – area of ongoing overburden and mining*
- *light green area – the area is already being rehabilitated with ongoing reclamation*
- *dark green area – area of ongoing redevelopment*
- *beige area – dump area (in the west there is a deposit of overburden materials from the plant area)*
- *dark grey – paths and workspaces*
- *light grey colour – current state of the terrain*

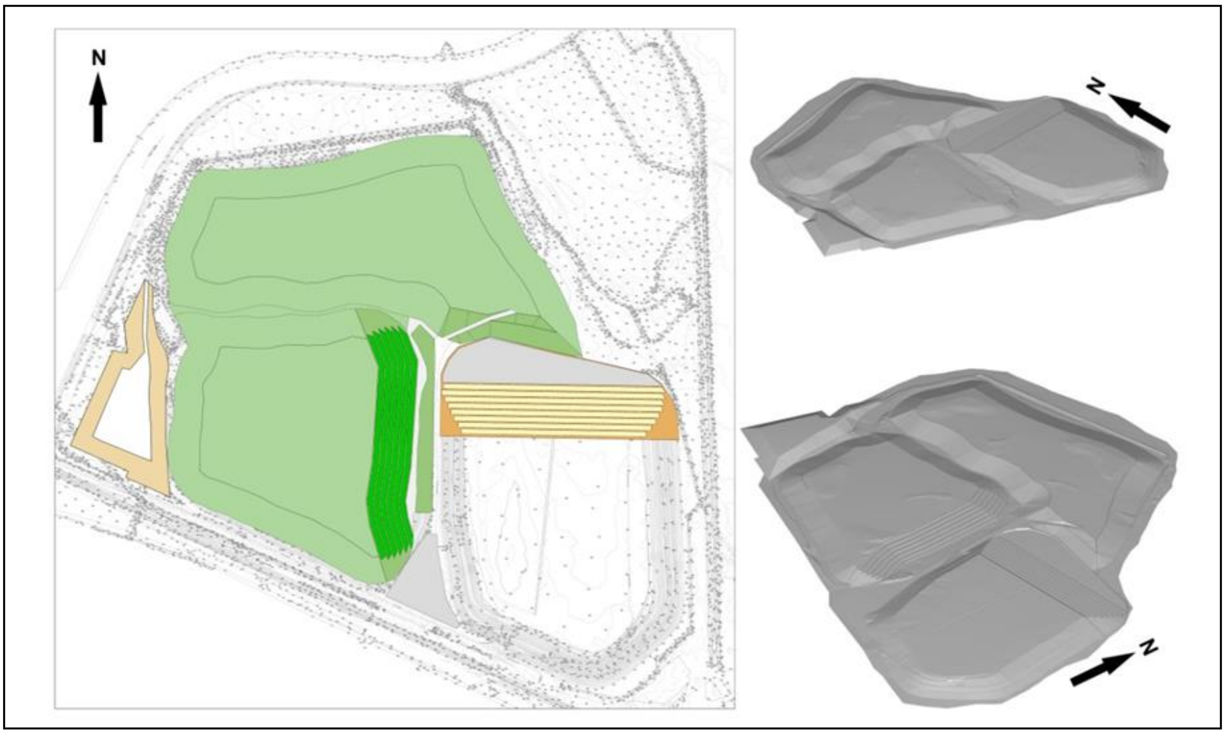
Picture no. 9: Mining process after the 3rd year

Picture no. 10: Mining progress after year 6

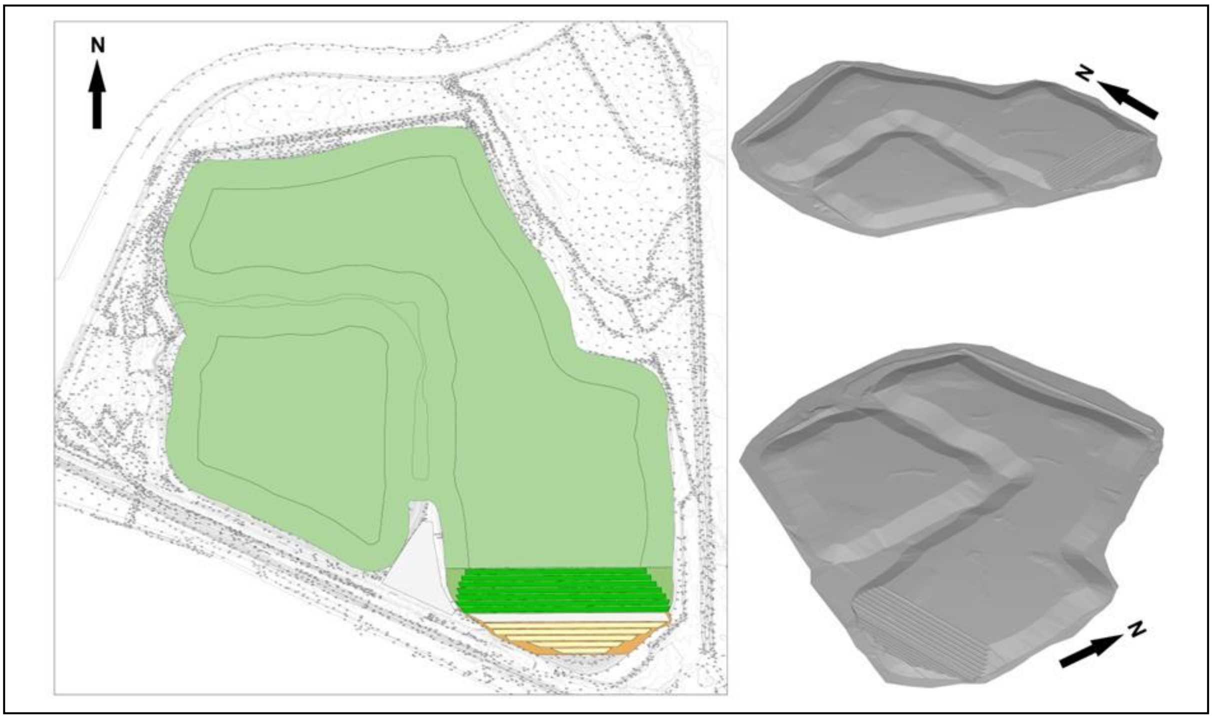
Picture no. 11: Mining process after year 12



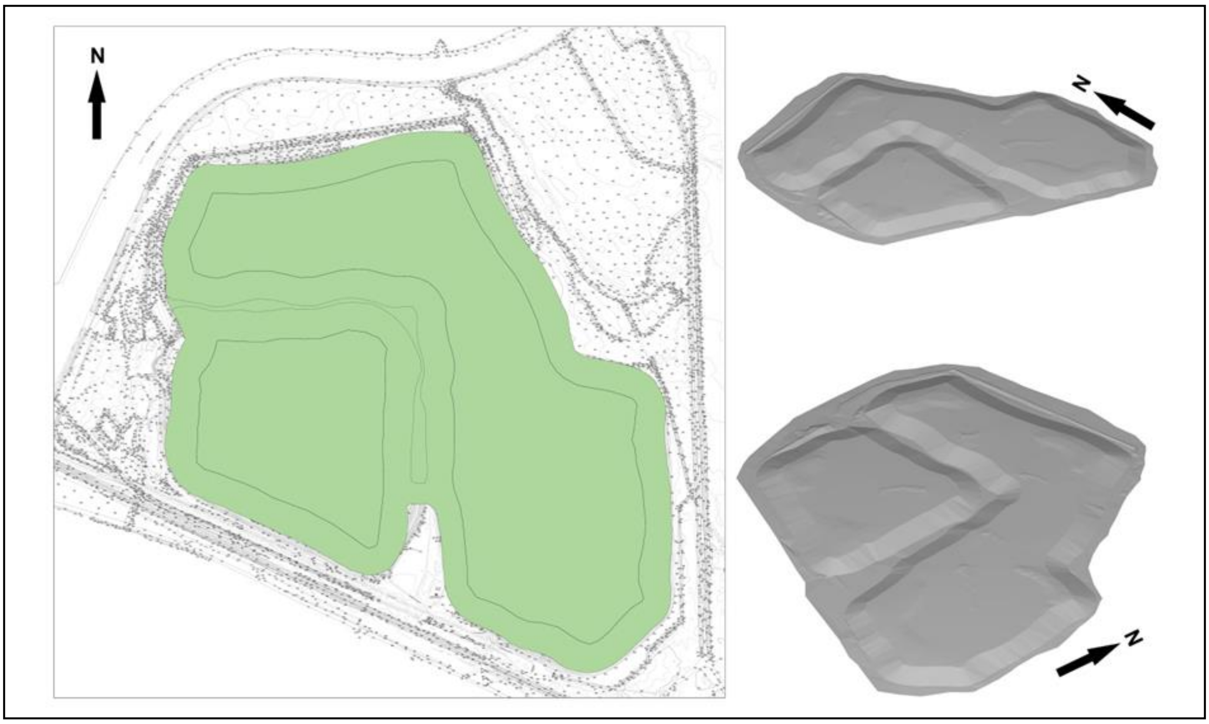
Picture no. 12: Mining process after the 18th year



Picture no. 13: Mining process after the 24th year



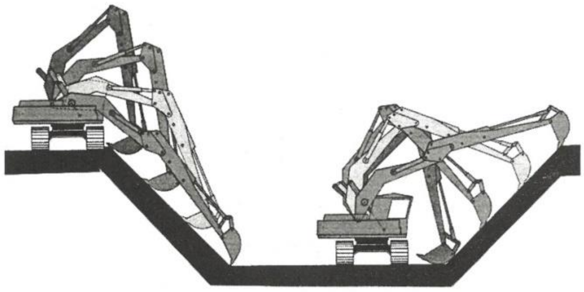
Picture no. 14: Completed mining and remediation of the area



The choice and description of the mining method

Mining in footbridges using excavators and trucks (dumpers) was chosen as the main mining method. This entails a bottom-up mining approach, where the excavator will be located at the foot of the mining cut, and the truck will also be located at the foot of the mining cut.

Picture no. 15: Scheme of the mining method



Explanatory notes:
-Excavator left: top-down mining
-Excavator right: bottom-up mining, ***mining method used***

The height of the mining cut will be 3 m and the slope will be 1:1 (45°). The distance between the working footbridge will be at least 12 m. With a mining cut height of 3 m, it will not be possible to extract slushy materials (GT3). When reducing the height of the mining cut to 2 m, the stability of the mining cut is already sufficient, but only when the excavator is positioned at the foot of the mining cut.

Mining can be affected by climatic conditions. Laboratory tests of the material show that significant moistening (e.g. during periods of prolonged precipitation) leads to slushing of the material and deterioration of geotechnical properties. This phenomenon does not apply to sandy material GT1, which is sufficiently permeable to water, and due to the prevailing sandy component, its properties will not be impaired.

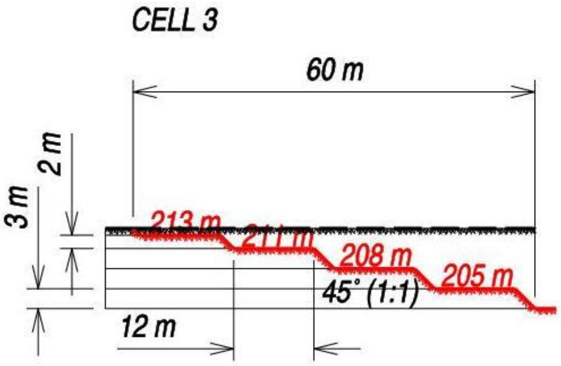
The slushy material of the GT3 will already have a high degree of saturation by itself and will probably not be able to hold more water. The deterioration of geotechnical parameters during heavy precipitation activity thus concerns only the GT2 powdery material. There are several possible ways to resolve this issue:

- reducing the height of the mining cut,
- reducing the slope of the mining cut,
- temporary cessation of mining,
- adapting the mining process (mining during the drier period), the type of mechanization and transport.

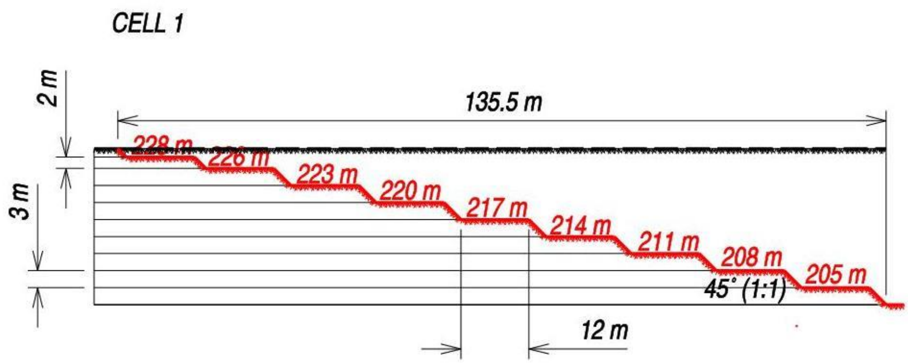
A similar mining procedure can be chosen in places with a surface load capacity below 95 kPa (the lowest value of a recommended truck).

The following Pictures show the basic parameters of overburden and mining cuts for different mining blocks (mining blocks 3, 1 and 2).

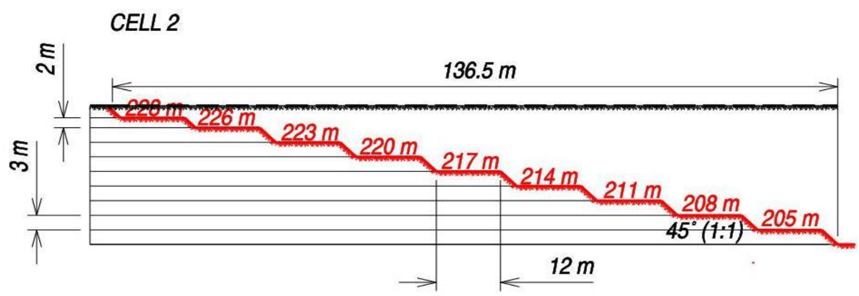
Picture no. 16: Overburden and mining cut of mining block 3



Picture no. 17: Overburden and mining cut of mining block 1 (CELL 1)



Picture no. 18: Overburden and mining cut of mining block 2 (CELL 2)



Calculation and assessment of surface load capacity in the planned mining area

The bearing capacity of the mining surfaces can be directly deducted from the results of the core drilling survey, which was carried out in the area of all three depots in 2018. One of the direct outputs of the measurement was the load capacity value of the material.(SGS CZ s.r.o., 2018)

The measured values ranged from 80 to 250 kPa, but very low (50 kPa) or, on the contrary, high (600 kPa) load capacity values were also found. These values were rather rare. Generally speaking, the load capacity of the GT1's sandy positions ranges from 150 to 250 kPa (but sometimes over 300 kPa), depending on the amount of fine-grained material. The load capacity of dusty positions is approximately between 120 – 220 kPa. Slush, wet positions have load capacity values between 80 – 110 kPa, but positions with load ratings between 65 – 75 kPa can also be found.

Dusty and sandy positions are sufficiently bearable for the movement of suitable heavy equipment. However, the slushy positions of the GT3 will be mostly unbearable even for ordinary heavy equipment. Therefore, in these slushy positions, crawler excavators with a load capacity of 65 kPa will be used during mining.

It is necessary to pay attention to the selection of suitable mining mechanization with regard to the results of the bearing capacity of the surface in the planned mining area. It will depend on the type of mechanization, the width and size of the tires and the maximum load of the mining machine.

4. Transport of raw material for preparation and working cycles, used mechanization

The extracted raw material will be transported by trucks (dumper, 40 t) to the raw material storage facility located in the area between cells 1 and 2.

The provision facility is designed to perform three functions:

- Receipt and storage of raw materials
- Raw material pulping
- temporary storage of recovered material (mining waste, mixture of NMT and LR)

The capacity of the raw material reservoir will correspond to the three-day operation and the capacity of the mining waste reservoir will correspond to approximately five days' operation of the processing plant.

The raw material in the facility will be taken by a front loader and dosed into a hopper, from which it will be transported by screw conveyors to two drum sieves, which are used to separate coarse impurities such as roots, stones and foreign materials. Due to the physical properties of the raw material, wet sieving using recycled process water will be used.

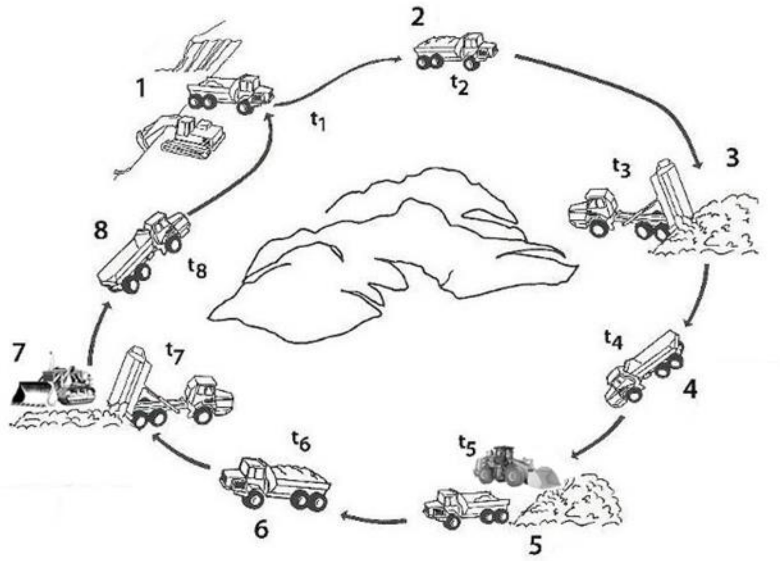
The sieved raw material will be mixed in the pulping tanks with recycled process water to form a slurry. The resulting slurry will be pumped through a pipeline located in a technological bridge (B42) leading across the railway corridor and the Chvaletice-Přelouč road to the storage tank located in the processing part of the plant.

Calculation of duty cycles and number of mining mechanisms

Duty cycle (Picture no. 19) of mining mechanisms has the following sections (1 – 8) and times (t1 – t8):

- section 1: process of loading mined raw material in time t1,
- section 2: Traffic, fully loaded lorry, journey beyond t2,
- section 3: handling during unloading, unloading of extracted raw material from time t3,
- section 4: Traffic, empty lorry, travel in time t4,
- section 5: process of loading mining waste in time t5,
- section 6: Traffic, fully loaded lorry, journey in time t6,
- section 7: handling on unloading, unloading of mining waste in time t7,
- Section 8: Traffic, empty lorry, travel in t8 time.

Picture no. 19: Duty cycle description



A variant using exclusively trucks is considered.

The following values were used as a basis for the calculations:

- Off-road laden truck speed: 12 km/h,
- Off-road empty truck speed: 17 km/h,
- Speed of the loaded truck on paved roads: 35 km/h,
- Number of working days: 250 days,
- Number of real hours in mining per shift: 7 hrs,
- Number of shifts per working day: 2 shifts,
- Loading time of a truck by one excavator: 150 sec,
- loading time of the truck with one front wheel loader: 90 sec,
- Handling time and unloading of the truck: 30 sec.

In the Feasibility Study and Mining Study, a selection of specific mining and auxiliary mechanisms was also carried out. The assembly was chosen due to its capacity, the bearing capacity of the subsoil of the existing terrain and the terrain of dumps built as part of the remediation of the area.

Basic assembly for mining:

- 2x excavators (type CAT 374FL, bucket volume 2,9 m3)
- 4x articulated dumper (type CAT 745)

Basic set for subsequent remediation work, creation of mining waste dumps:

- 2x wheel front loader (type CAT 972M)
- 3x dozer (type CAT D6N)
- The material will be brought in by dumpers, who will also transport the excavated material

Auxiliary mechanization for both processes, mining and remediation consists of the following mechanization:

- 1x grader (type CAT 160)
- 1x vibrating roller (type CAT CP12)

- sprinkler truck
- other mechanization (forklift in the workshop, truck, service van, transport tank for fuel)

Table No. 8: Selection of mechanisms, number, type, consumption

Use and number of machines	Unit	Total
CAT 374 excavator		
Operating hours/year	h	**49 626**
Number of MAX machines	#	**2**
Diesel consumption	l	**1 836 173**
CAT 972M loader		
Motohours/year	h	**55 549**
Number of MAX machines	#	**2**
Diesel consumption	l	**905 448**
CAT 745 dumper		
Motohours/year – total	h	**218 234**
Number of MAX machines	#	**4**
Diesel consumption	l	**7 482 279**
Bulldozer D6N		
Motohours/year	h	**81 523**
Number of machines	#	**3**
Diesel consumption	l	**2 038 069**
Grader CAT 160		
Motohours/year	h	**32 130**
Number of machines	#	**1**
Diesel consumption	l	**642 600**
Vibrating cylinder CAT CP12 GC		
Motohours/year	h	**53 550**
Number of machines	#	**2**
Diesel consumption	l	**669 375**
Other/auxiliary equipment		
Diesel consumption	l	**7 500**

Note:
The specific type of mechanization is given only as an example illustrating in particular the performance parameters of the machine; There may be similar mechanisms of the same or other manufacturers.

In the calculations, a margin exceeding 20 % was included in the calculation. This reserve will be used for overburden work as well as for possible increased mining and transport to replenish the raw material reservoir after a climatically unfavorable period when mining will have to be stopped or limited due to weather conditions.

The capacity of mining and return transport is calculated so that within 5 working days (1st and 2nd shift) the required amount of material for the whole week of operation (7 days, 3 shifts) is provided. If, due to climatic or other conditions, there is a temporary decrease in mining/storage capacity, the missing amount of material will be supplemented by increased mechanization performance in the following days (calculated capacity reserve of 20%). In exceptional cases, e.g. during periods of prolonged heavy rainfall, the missing amount of material would be replenished during extraordinary shifts organised on non-working days or rest. Even in this case, mining and storage would be carried out in one, maximum two working shifts.

Replenishment of the reservoir will not affect the annual output of mining. Replenishment will replace the previous short-term outage. At the same time, the increased daily output will not affect operating hours or fuel consumption.

The mining capacity is based on a balance of 26,644,344 t of recoverable reserves of raw material (manganese tailings) in the dry state, the natural humidity of the deposit is about 21%. This amount of manganese tailings will be extracted in about 25 years, which represents an annual extraction of about 1,065,770 t (dry raw material). After taking into account the moisture content of the raw material, the average extraction is about 1,289,580 tons of material/year. Basic capacity data are given in the following table (Table No. 9).

Table No. 9: Annual mining base capacity data

Year	Raw material		
	t/year, dry	**t/year, wet**	**max. t/day wet**
-1	0	0	0
0	0	0	0
1	718131	861757	5700
2	1112500	1335000	5700
3	1106900	1328280	5700
4	1070250	1284300	5700
5	1012138	1214565	5700
6	1040279	1248335	5700
7	1079722	1295666	5700
8	1096946	1316335	5700
9	1016181	1219417	5700
10	1010000	1212000	5700
11	1016139	1219366	5700
12	1016685	1220022	5700
13	906815	1088178	5700
14	833643	1000371	5700
15	1055843	1267011	5700
16	1085131	1302157	5700
17	1129690	1355628	5700
18	1167828	1401393	5700
19	1236713	1484055	5700
20	1195889	1435067	5700
21	1184332	1421198	5700
22	1235765	1482918	5700
23	1183309	1419971	5700
24	1136531	1363837	5700
25	996988	1196385	5700
Total	**26644344**	**31973213**	
Maximum / year	***1236713***	***1484055***	

5. *Transport and disposal of mining waste*

Method of storage

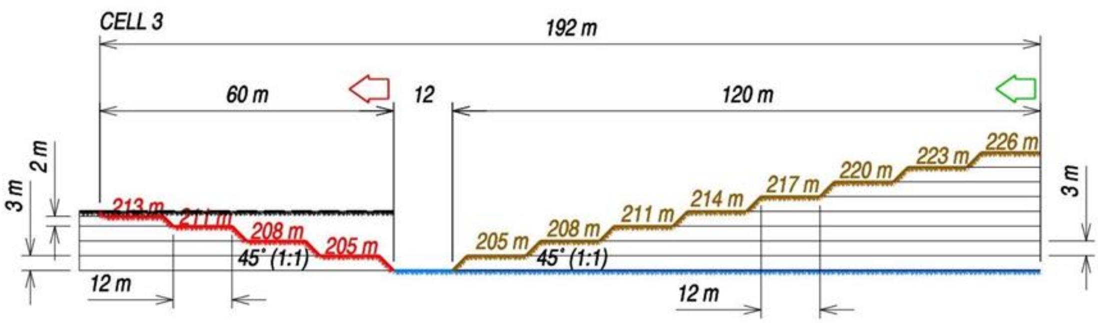
The basic method of remediation and reclamation consists in the re-deposit of material from manganese tailings treatment, ensuring the safety and stability of the newly modeled terrain and performing biological reclamation.

In terms of legislation, the material from the treatment is characterized as mining waste according to Act No. 157/2009 Coll., on Mining Waste, as amended. The inclusion here is based on the opinion of the Czech Mining Authority (ČBÚ) here on 10.7.2019, ref. SBS20517/2019/ČBÚ-21.

The stored material will consist of two components, which will be transported to the mining area in a pre-mixed state directly from the production plant. For the purpose of the mining study, two samples labeled NMT (non-magnetic) and LR (leaching residue) were submitted for analysis. Basic classification analysis and compaction tests (Proctor Standard), IBI (Immediate Bearing Index) and CBR (California Bearing Ratio) were performed on both samples. Furthermore, a mixture of samples was created from the remains of the samples in a ratio of 55:45, the sample was marked as NMT/LR. On this sample, granular classification of the material was carried out. It is believed that this mixed material will be the main component of dumps. Details of its properties are given in Chapter B.II.7.

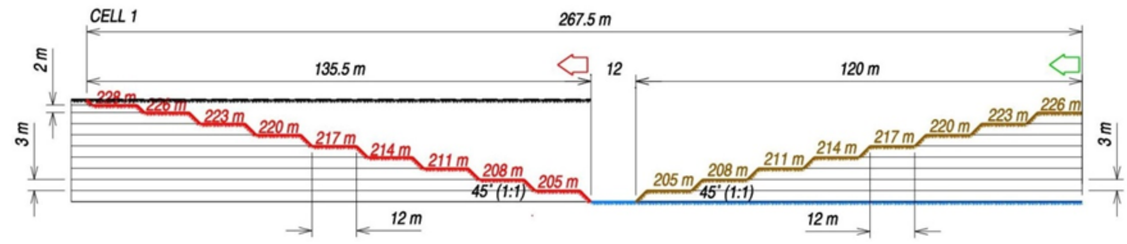
Mining waste will be deposited in a layered repository. A truck (dumper) unloads the mining waste in front of the upper edge of the footbridge and the dozer then adjusts the area to the plane. The area will be compacted by the travel of dumpers and dozer. The distance between the working footbridge will be at least 12 m. The minimum length of the open area will vary depending on the height of the mining block. This is described in detail in the following pictures.

Picture no. 20: Working distance between mining and remediation in mining block 3



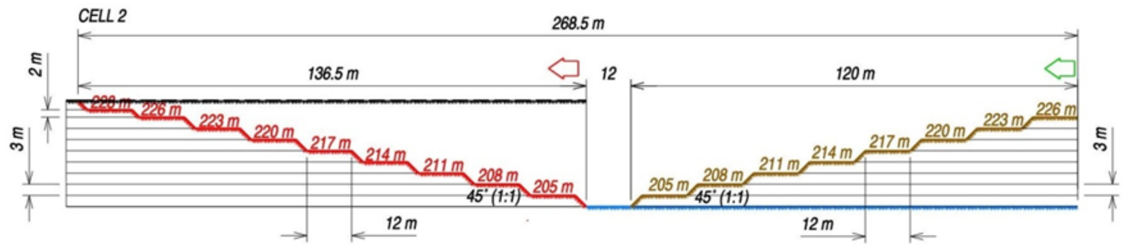
Explanatory notes:
- *Red arrow – direction of overburden and mining*
- *Green arrow – direction of remediation progress*

Picture no. 21: Working distance between mining and remediation in mining block 1



Explanatory notes:
- *Red arrow – direction of overburden and mining*
- *Green arrow – direction of remediation progress*

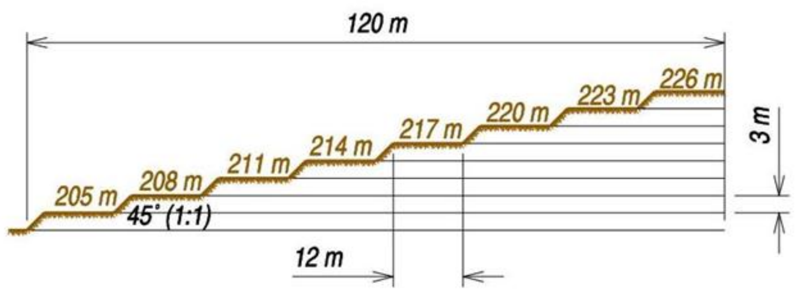
Picture no. 22: Working distance between mining and remediation in mining block 2



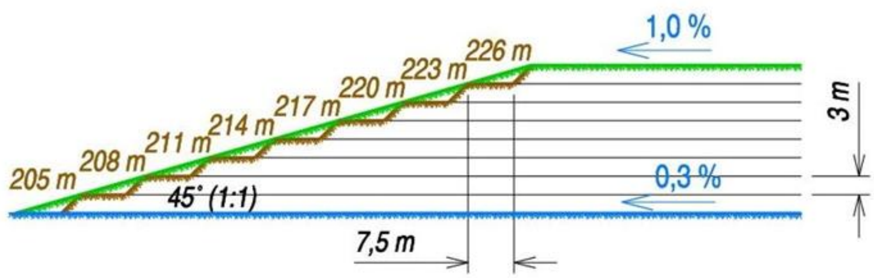
Explanatory notes:
- *Red arrow – direction of overburden and mining*
- *Green arrow – direction of remediation progress*

The deposition of mining waste in layers, indicating a minimum working distance of 12 m for the footbridge, is described in the picture (Picture no. 23). In the picture (Picture no. 24) describes the procedure for completing the shaping of a dump from mining waste.

Picture no. 23: Cut when depositing mining waste in layers



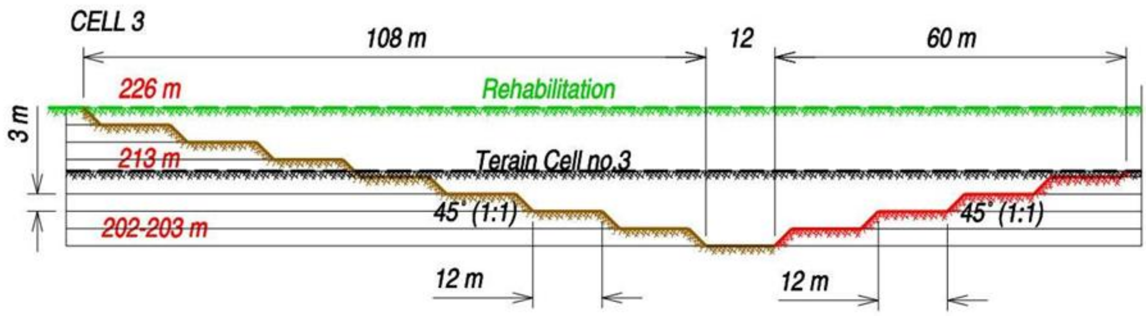
Picture no. 24: Cut when depositing mining waste in layers when terminating the shape of the dump



Explanatory notes:
- *Blue chute – direction of drainage gradient*

- *Green arrow – direction of remediation progress*

Picture no. 25: Illustrative section of mining, deposition of mining waste and the resulting height of the reclaimed dump in mining block 3



Explanatory notes:
- *Black line – current terrain*
- *Red line – ongoing mining*
- *Brown line – ongoing dumping of mining waste*
- *Green line – completed reclamation*
- *Green arrow – direction of remediation progress*

The total volume of deposited mining waste (wet) will be approximately 34.6 million tonnes. The amount of mining waste to be deposited in each year is shown in the table below. At the same time, it also includes a lot of material from the temporary deposit, which will be used for the remediation of the repository (base and top layers).

Table No. 10: Basic annual capacity data for remediation and reclamation

Year	Mining waste			Landfill (material from the construction of the processing plant)			
	t/year, dry	t/year, wet	max. t/day wet	Stored quantity m3	Used m3	max. m3/day, wet	.max. t/day, wet
-1	0	0	0	650000	0	0	0
0	0	0	0	590000	60000	1000	1550
1	746856	933570	5700	565000	25000	1000	1550
2	1157000	1446250	5700	540000	25000	1000	1550
3	1151176	1438970	5700	505000	35000	1000	1550
4	1113060	1391325	5700	470000	35000	1000	1550
5	1052623	1315779	5700	430000	40000	1000	1550
6	1081890	1352362	5700	390000	40000	1000	1550
7	1122911	1403638	5700	350000	40000	1000	1550
8	1140824	1426030	5700	310000	40000	1000	1550
9	1056828	1321035	5700	285000	25000	1000	1550
10	1050400	1313000	5700	260000	25000	1000	1550
11	1056784	1320980	5700	240000	20000	1000	1550
12	1057353	1321691	5700	220000	20000	1000	1550
13	943087	1178859	5700	200000	20000	1000	1550
14	866989	1083736	5700	180000	20000	1000	1550
15	1098077	1372596	5700	160000	20000	1000	1550
16	1128536	1410670	5700	140000	20000	1000	1550
17	1174877	1468597	5700	120000	20000	1000	1550

Year	Mining waste			Landfill (material from the construction of the processing plant)			
	t/year, dry	**t/year, wet**	**max. t/day wet**	**Stored quantity m3**	**Used m3**	**max. m3/day, wet**	**.max. t/day, wet**
18	1214541	1518176	5700	100000	20000	1000	1550
19	1286181	1607727	5700	80000	20000	1000	1550
20	1243724	1554655	5700	60000	20000	1000	1550
21	1231705	1539631	5700	40000	20000	1000	1550
22	1285195	1606494	5700	20000	20000	1000	1550
23	1230641	1538301	5700	0	20000	1000	1550
24	1181992	1477490	5700	0	0	0	0
25	1036867	1296084	5700	0	0	0	0
Total	**27710118**	**34637647**			**650000**		
Maximum / year	***1286181***	***1607727***			***60000***		

Calculation and assessment of surface load capacity in the planned area of dumps

The results of the analysis of the properties of the recycled material showed that the mixed material will have the properties of clay with low plasticity. Geotechnical parameters are given in the table below (Table No. 11).

Table No. 11: Geotechnical parameters of NMT/LR material based on classification according to ČSN 73 6133

Soil according to ČSN 73 6133	**N**	**β**	**γ kN.m3**	***E_{def}* MPa**	**c_u kPa**	**φ_u (°)**	**c_{ef} kPa**	**φ_{ef} (°)**	**Rdt* kPa**
Material NMT	0,40	0,47	17,0	6-8	80	0	8-16	17-21	60-143
LR material	0,40	0,47	17,0	3	45	0	8-16	19-23	70-166
Material NMT/LR	0,40	0,47	17,0	6-8	80	0	12-20	17-21	60-143

Explanatory notes:

ν	*Poisson number*	c_u	*Total cohesion*
γ	*volumetric weight*	c_{ef}	*Consistency effective*
β	*Conversion factor*	φ_u	*internal friction angle total*
E_{def}	*Transformativeness module*	φ_{ef}	*internal friction angle effective*

** load capacity Rdt calculated over an area of 1 m^2 for average values c_{ef} 8-16 kPa and φ_{ef} 17-21° for soft consistency, with a density of 17,0 kN/^{m3}*
the volumetric weight has been adjusted for the material

From the last column of the table, it is clear that the load capacity range is between 60 kPa and 143 kPa, the average load rating is around 101 kPa. This load carrying capacity is sufficient for the movement of suitable heavy equipment.

Problematic is the deterioration of the geotechnical parameters of recycled material in the case of intensive moistening, when the material becomes very unbearable. In the event of heavy rainfall, the material may become temporarily unbearable until it drains/dries.

Traffic routes

Trucks (dumpers) will be used to transport the extracted raw material and return the mining waste to the site of the ongoing remediation. The main quarry road and purposeful, operational, quarry roads will be used for transport.

During one truck (dumper) journey, it will be transferred from the place of unloading of mining waste to the place of loading of raw materials. The distance of these places depends on the individual years of operation of the quarry. The following Pictures show the procedure with these routes:

- Route 1: from loading of raw material to the place of unloading,
- Route 2: from the place of unloading of mining waste to the extraction site,
- Route 3: from the loading of mining waste to the place of unloading of mining waste
- Route 4: from the unloading of the raw material to the loading point of the mining waste,
- Route 5: removal of overburden materials created during the construction of the plant.

The traffic pattern in selected years of mining is shown in the pictures (Picture no. 26 only Picture no. 31).

Picture no. 26: Transport scheme in the 1st year

Explanatory notes:

- *yellow area – area of ongoing overburden and mining*
- *light green area – the area is already being rehabilitated with ongoing reclamation*
- *dark green area – area of ongoing redevelopment*
- *beige area – dump area (in the west there is a deposit of overburden materials from the plant area)*
- *dark grey – paths and workspaces*
- *light grey colour – current state of the terrain*

Picture no. 27: Transport scheme in the 3rd year

Picture no. 28: Transport scheme in the 6th year

Picture no. 29: Transport scheme in year 12

Picture no. 30: Transport scheme in year 18

Picture no. 31: Transport scheme in year 24

Mining waste will be deposited in layers. The truck unloads the mining waste in front of the upper edge of the footbridge and the dozer then adjusts the area to the plane. The surface will be partially compacted by truck and dozer travel, the final compaction will be carried out by a compaction roller.

Technical parameters of quarry roads

The main quarry road will be built with the progress of mining. The first section of 0.5 km will be built before mining starts. It will connect the area of the quarry background with the area of the first stage of mining. The main quarry road will significantly increase the speed of transport. Other sections of roads will consist of purpose-built unpaved roads directly in the terrain.

If mining continues, a subsequent section of 0.5 km to the west will be completed. The main quarry road will therefore have a total length of 1.0 km. The road has a 0.5 km curve with a turning radius of 15 m for trucks.

The width of the road will be 10.0 m. Width is fully sufficient for two-way traffic. The road will be reinforced with a cement-concrete surface (concrete technology with a surface of exposed aggregate without the use of reinforcement), the diagram is shown in the picture (Justification for the location of the project and description of the options considered by the developer, stating the main reasons for choosing the solution, including a comparison of the environmental impacts

Justification for the location of the project

The main reason for placing the project at the site is the accumulation of the raw material – manganese ore. It is a deposit of a reserved mineral, for its extraction it is necessary to determine the mining area. The deposit is inherently non-movable, and its extraction must therefore take place in the given locality. It is not typical for this type of economic activity that the deposits are of anthropogenic origin.

Another reason is the fact that it is a burden of anthropogenic origin, potentially threatening components of the environment.

The intention to use the deposits of sludge deposits from the former tailings of Manganorudné a kyzové závody, n.p. Chvaletice, is focused on the production of high-purity electrolytic metal manganese and high-purity manganese sulphate monohydrate without the use of selenium and chromium. The production is two-stage, in the first stage metallic manganese is produced (represents about 30% of production), in the second stage part of the produced metal manganese is processed into manganese sulphate (represents about 70% of production).

For the Czech Republic, but also for the whole of Europe, this is an opportunity to proceed in accordance with the Green Deal, which aims to accelerate the decarbonization of the whole of Europe and meet the principles of the circular economy. The implementation *of the "Recycling of the Chvaletice-Trnávka tailings*" will guarantee a certain degree of self-sufficiency in the supply of high-purity manganese products and thus reduce the carbon footprint of their production and transport from China, where more than 90% of manganese suitable for electric vehicle batteries is currently imported.

Lithium-ion batteries for electric vehicles are based on NMC (nickel-manganese-cobalt) chemistry. Along with nickel, lithium and cobalt, manganese is one of the key elements for their production. With the development of sustainable energy sources and electromobility, the demand for manganese is growing significantly. Especially in this area there is potential and opportunity for effective and meaningful use of the Chvaletice deposit.

According to qualified estimates, the planned capacity of lithium-ion batteries in Europe will increase several times by 2030 to around 1,400 GWh, most of which will be manganese. High-purity manganese products in the form of manganese sulphate and metallic electrolytic manganese will be supplied by MANGAN Chvaletice, s.r.o. to manufacturers of electric vehicles, batteries and materials for active cathodes primarily in Europe. The European market is the fastest growing market for high-purity manganese.

The aim of the investor is to become the main supplier of high-purity manganese products to the European electric vehicle market and to provide customers with products of the highest quality, traceable origin, produced without ethical compromise. This will contribute to Europe's raw material self-sufficiency in a key period of structural changes in the European energy sector. The strategic importance of the project is also illustrated by the support from the European Commission and the acquisition of capital investment from the European Bank for Reconstruction and Development (EBRD) to ensure the preparation of the project.

Production plant of MANGAN Chvaletice, s.ro. will also become the only high-purity manganese plant in Europe to source and process the raw material at the same site.

The proposed area of the DP lies in the protected deposit area (CHLÚ) Trnávka (71048). The total area of CHLÚ Trnávka is the same as the area of the proposed DP, ie 1.193475 km^2. The area of our own exclusive deposits is approximately 86.73 ha.

On 17.4.2018, the Ministry of the Environment issued an MŽP OVSS VI under the ref. MZP/2018/550/387-Hd ZN/MZP/2018/54 decision, granting prior consent (PS) to submit a proposal to determine the Trnávka mining area for mining exclusive manganese ore deposits Chvaletice – tailings ponds 1,2, deposit no. 3104804, and Řečany – tailings pond 3, deposit no. 3243700, in the cadastral register. Trnávka and Chvaletice organized by MANGAN Chvaletice, s.r.o.

The DP is designed to include entire deposits and other areas needed for mining and related activities (tailings slopes, areas for handling raw materials and storing waste material from treatment, transport, etc.).

The location of the production plant is based on the location of the current industrial zone, which has the character of a predominantly brownfield in the used part. The main advantage of the proposed location of the processing plant is its proximity to the tailings area and the possibility of connecting both parts with a technological bridge.

Description of the options considered by the investor

The localization of the project is based on the location of the mineral deposit. From this point of view, the position of the project is therefore invariant within the area of the exclusive deposit.

The specific intention to mine the deposit is based on the developer's request and is defined by the location of the deposit itself, specific property relations and potential conflicts of interest, whether in the area of technical and transport infrastructure, as well as with regard to the potential impacts of the project on the environment and public health. The plan respects the requirement of the Ministry of the Environment to issue opinions on mining plans for a period of approximately 20 years (see above).

The intention is therefore designed in one variant.

When assessing the environmental impacts of a project, two options are also considered, namely the project variant – which counts on the implementation of the plan and the zero variant – in which the plan will not be implemented.

The zero variant (variant V0) is the reference variant (not the design variant). It describes the situation in the event that the mining lease and the mining activity permit are not determined in the manner described in the project variant and the deposit will not be mined. The variant serves to compare the impacts related to the implementation of the project (noise, air pollution, traffic, landscape character, etc.), respectively to determine their qualitative and quantitative differences and to evaluate the overall significance of the impacts of the project variant.

The project variant (VP variant) describes the state when the plan is implemented. Mining will take place with the course of implementation and technological solution described below. The description of the project variant including inputs and outputs is given in the relevant chapters of Part B of this text.

When processing the EIA notification, the following two subvariants were taken into account, where the method of transport and storage of waste material after mining and the method of remediation and reclamation were further addressed.

Sub-variants with regard to the re-transport of mining waste:

A. trucks

B. belt conveyor to the final place of deposit of mining waste

Subvariants in terms of remediation and reclamation:

Y1. Creation of a body of water in the central part of the territory

R2. Remediation and reclamation without this water area

Subvariant B is no longer considered in this EIA documentation. Similarly, the method of remediation and reclamation is no longer an option. The proposal for remediation and reclamation of the territory is a combination of variants R1 and R2, which aims to support the formation of wetland communities and rainwater retention in the territory. From the first variant, the dam was preserved, which had the task of creating a permanent water area in the central part of the territory. The currently designed dam is with a lower outlet and the central depression will serve as a dry polder that will retain torrential rainfall and gradually drain it. The concept of arranging the valley floor is then taken from the second variant – when a smaller recess below ground level (0.5 – 1 m) was created as part of technical reclamation around the channel draining rainwater leading through the central depression in the south-west direction to the dam. The formation of shallower depressions creates periodically flooded pools retaining rainwater in the area. This will allow the emergence of hygrophilous or wetland communities with the assumption of support of especially amphibious animals.

7. *Description of the technical and technological solution of the project, including any demolition work necessary for the implementation of the project; in the case of projects falling under the regime of the Act on Integrated Prevention, including a comparison with the best available techniques, associated emission levels and other parameters*

Due to the scope of the chapter, its brief content is given below. This Chapter B.I.6. It is further divided into 4 basic parts, which are further divided into individual subchapters as needed:

a) Mining part

- *Basic characteristics of individual technological units*
- *Detailed description of individual activities*

b) Quarry facilities

- *Description of facilities*
- *Method of operation in the background*
- *Time pools and shifts in mining*
- *Construction of quarry facilities*

(c) Processing plant

- *Basic description of the processing plant premises*
- *List of structures*
- *Technological process of production of electrolytic manganese metal (EMM) and manganese sulphate monohydrate (MSM)*
- *Time funds and shifts in part of the plant*
- *Construction of a processing plant*

(d) Comparison with best available techniques (BAT)

b) Mining part

The proposal for mining and remediation of deposits is based on the Feasibility Study and the update of the mining study. From the technological point of view, the assessed project consists of the technological units described below. Details of individual activities are then given in the next subchapter.

Basic characteristics of main technological units

9) Construction of a temporary external deposit

Before the start of mining, a temporary deposit of overburden material from the plant construction area will be built in the western part of the area of interest (on the western side of mining block No. 1, outside the proposed Trnávka DP). Its maximum disposable volume will be approximately 777,500 m3 and the area of approximately 62,160 m2. It will be built in footbridges. Its slope will be 1:2 to 1:2.5 andmaximum height is 15 m. This temporary deposit will be fully processed during the lifetime of the project. The material from it will be continuously used for remediation work directly in the DP. This will eliminate the import of soils for overburden by road transport, which was considered in the notification of the intention for the screening procedure. Details of this deposit are given below in the text, including part of the construction of the plant.

Picture no. 7: Temporary deposit of overburden material from the plant construction area

Explanatory notes:
- *beige area – dump area (in the west there is a deposit of overburden materials from the plant area)*
- *light grey colour – current state of the terrain*

10) Removal of woody plants

Trees (mainly shrubs and stands of the character of rods) will be removed during the period of dormancy. The area of the removed trees will approximately correspond to the harvesting progress for the following year (until the next period of dormancy). This cycle will be repeated. The wood mass will be chipped on site (there are almost no trees in the area that could be used on the timber market). The resulting wood chips will be used as a source of organic matter for reclamation. The produced wood chips will be temporarily stored directly in the reclamation area or in the inter-deposit area of overburden materials.

11) Overburden work

Overburden of topsoil and subsoil and its separate deposit on deposits or on the site of ongoing technical reclamation

Overburden work will be carried out well in advance of the mining work due to the need to prepare the area for mining.

Overburden of the upper humic layers and the lower non-humic layer will be performed separately.

Overburden and mining waste from the quarry opening (i.e. from the initial phase of mining and processing of the raw material) will be deposited in an external deposit in the eastern part of the territory in the mining area. This is the area between the east side of mining block 3 and the north side of mining block 2. This depot will have a capacity of 273,000 m3. This deposit will free up space for further deposits on the already excavated area.

Materials from overburden will be transported mainly directly to the place of final disposal for remediation and reclamation of the area, i.e. they will be overlaid with the top insulation of the dump of the deposited material after ore (mining waste) treatment. If, in the given period, the amount of overburden material obtained exceeds the need for material for the unfinished area of remediation and reclamation, the material will be stored in the inter-depot. The material from the inter-deposit will be used in cases where the amount of overburden material is not sufficient for the remediation and reclamation of the unfinished area of the repository. The remediation and reclamation of the repository is planned in such a way that after completion of the works, there will be no material left for the intermediate deposit.

12) Mining work

- mining activities, extraction of raw materials in footbridges

Mining work will be carried out on footbridges from the bottom up with a gradual gravitational drainage system of channels and pits. The minimum working distance of individual mining cuts will be 12 m. Cutting inclination 45° and height from 3 m to 2 m.

13) Preparatory work for the disposal of mining waste

- comparison of the basis for the disposal of mining waste,
- Loading of base layers: aggregates, certified recyclate from the demolition of an industrial plant, geotextiles, insulating layer, certified insulating material, drainage system

The area for the storage of mining waste will be prepared continuously with the termination of mining on the last mining footbridge.

14) Disposal of mining waste

Mining waste will be deposited in layers (dumper by trucks), the material will be spread by a dozer and compacted with a roller.

15) Technical reclamation of the territory

The resulting shape of the dumps will be gradually shaped by depositing mining waste and treated by a dozer. On the sides and on the surface, the hoppers will be layered:

- insulation layer, certified insulation material,
- geotextiles,
- top layer of dump, clay fill and fertilizable layers.

The surface of the dumps will be gravitationally drained into a natural micro-basin with a central retention area, a dry polder. Water at the outer edges of the dumps will naturally be drained into ditches. Ditches will be built around the perimeter of the dumps.

Humic soil from overburden will be brought to the surface of the dumps, which will be evenly distributed and leveled.

16) Biological reclamation of the territory

Biological reclamation will aim at biological revitalisation of the remediated areas so that they can be handed over for subsequent use. A combination of natural and recreational functions is envisaged.

Detailed description of individual activities

6. Opening and preparation, direction of mining progress

The mining area is divided into three separate units. On the north side it is the tailings cell No. 3, on the southwest side it is the tailings cell No. 1 and on the southeast side it is the tailings cell No. 2. In the following text, the equivalent term mining block is also used for tailings, if it concerns their extraction.

The depots were created as tailings by depositing waste from flotation treatment of the raw material of the Chvaletice pyrite and manganese ore deposit. The flotation sludge was gradually deposited at three tailings throughout the operation of the processing plant for the production of pyrite concentrate in the years 1951–1975.

Before the actual opening of the deposit, the area for the repository in the eastern part will be prepared. This area is located in the triangle between tailings No. 2 and 3 and the north-eastern boundary of the DP. At present, it is mainly an agriculturally managed area, plot No. 662/1 in the cadastral area. Trnávka is registered in the Land Register as an agricultural land fund (ZPF). Therefore, before the start of implementation, this land must be permanently withdrawn from the ZPF. Topsoil and any subsoil from this area will be segregated separately and placed on the deposit in the peripheral part of this area or on the deposit west of the DP. The intention of the investor is to use topsoil and subsoil for reclamation work. This intention requires the approval of the ZPF protection authority.

Mining will begin in the eastern part of cell 3 and will proceed towards the west. Mining will then move to the western part of cell 1. Subsequently, the advance will be within cell 1, from west to east. After the end of mining in cell 1, mining will move towards cell 2, where it will proceed from north to south. The thickness of cell 3 is the smallest (compared to other depots, about 12 m). The smaller thickness of the tailings cell 3 means faster mining progress and, as a result, faster clearing of land for the construction of the repository. Tailings cell No. 3 will be excavated during the first four years. The remaining tailings are higher and thus the mining progress will be slower.

7. Overburden work

Overburden work will be carried out technically in the same way as mining work, with small overburden thicknesses it is possible to use a dozer. The direction of the progress of overburden work will be identical to the progress of mining work. It will be ensured about a year in advance of the overburden work before the mining works.

The dozer rolls up the overburden on a mound, which is then loaded with an excavator onto a truck (dumper) that transports the overburden to the place of storage.

The deposits themselves consist of 3 different horizons:

4) overburden containing humus,
5) overburden other,
6) raw material.

Separately, the hiding of the humus horizon will be removed in those places where this horizon is located. This applies in particular to tailings No 1 and 2. At the tailings cell No. 3, this horizon is only discontinuous.

At tailings cell No. 3, the humus layer will be overlaid in places where this layer is thick enough to be separated from the raw material (tailings cell No. 3 was not mostly covered by overburden after the closure of its activities).

At tailings cells No. 1 and 2, the humic layer will also be removed separately, the beginning of these works will be in the 4-5th year of mining before the transition to this part of the deposit. Humic materials will then be deposited at the place of final storage for remediation and reclamation. The thickness of the humic layer is approximately 0.05 – 0.13 m according to the individual tailings.

Overburden of humic layers at the tailings will be carried out by a set of working machines (dozer, excavator or loader) and the required number of trucks (dumpers) in one daily shift will average only a few days a year. Machines that perform mining and transport of raw material on normal days will be used. Therefore, there will be no increase in traffic or the number of mechanizations on overburden days.

Overburden will be directly deposited on the area of the ongoing redevelopment. In the first years of mining, when the space for overburden will not be ready for the area of ongoing remediation, the overburden (subsoil and topsoil) will be deposited separately on the outer dump (external deposit). Subsequently, they will be used for the redevelopment of other areas.

Woody vegetation will always be removed before overburden is made. With regard to the protection of birds (§5a of Act No. 114/1992 Coll.), the removal of trees and overburden of the upper layer will be carried out only in the non-nesting period and in the period of dormancy, i.e. from October to March. The wood mass will be chipped and used for the reclamation of the repository.

Part of the opening work is also the rest of the overburden, i.e. the removal of non-humic material covering the tailings or forming its slopes. Tailings cell No. 1 and 2 contain mainly stony clay from the Chvaletice granite quarry in the thickness of 1.47 m (tailings cell No. 1) and 1.70 m (tailings cell No. 2), but the occurrence of other materials of soil and stone character is also possible. In the case of tailings cell No. 3, the overburden was calculated on average at 0.95 m, but it is made up of several different types of material and in some parts it is not found at all. Before overburden is carried out at these tailings, a more detailed sampling will be carried out and if material that could not be suitably used for reclamation is found, this material will be classified according to the waste catalogue and handed over to the authorized person as waste for disposal or use.

Overburden of non-humic layers will be carried out by a set of working machines (dozer, excavator and the required number of trucks (dumper)) in one-to-two-day shifts. Machines that perform mining and transport of raw material on normal days will be used. The reserve for overburden work is already calculated in machine operating hours and fuel consumption. Therefore, there will be no increase in traffic or the number of mechanizations on days with overburden (see below). With small overburden thicknesses, it is also possible to use a dozer. The dozer rolls up the overburden on a mound, which is then loaded onto a truck (dumper) using an excavator, which transports the overburden to a place of temporary or permanent storage.

The total volume of overburden is approximately 1,222 thousand m3. The number of days with overburden work will be variable. On average, it will be necessary to relocate about 50,000 m3 of overburden annually (in a year with a maximum overburden of up to 80,000 m3, with a minimum overburden of 11,000 m3). The theoretical daily output of overburden may be equal to the expected daily extraction (all mechanization would perform only overburdening) or even slightly exceeded it, due to the shorter transport distances of these materials. The daily output of overburden will be around 2500 t, the number of days with overburden is then based on an average of 50 days a year (range according to the amount of overburden and capacity possibilities of about 10 – 60 days a year). The following table clearly shows the amount of overburden handled in each year.

Table No. 7: Overview of the amount of overburden handled

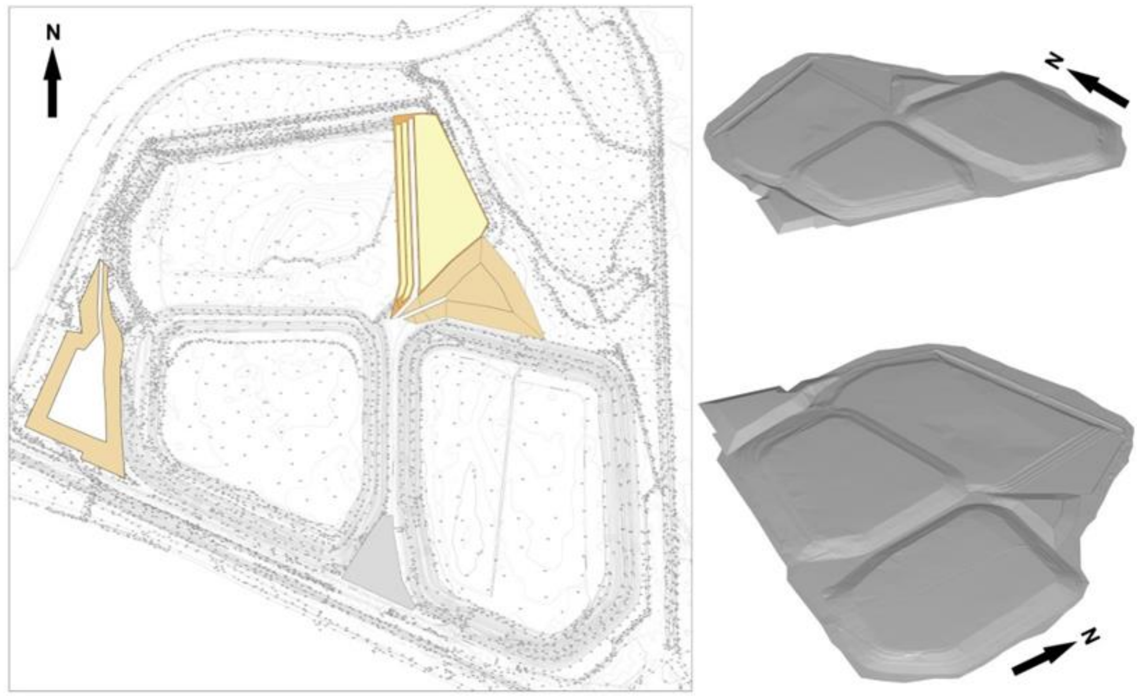
Year	Overburden		
	m3/year	t/year, wet	max. t/day wet
-1	0	0	0
0	0	0	0
1	38 373	69 071	2 500
2	44 663	80 394	2 500
3	48 018	86 433	2 500
4	36 276	65 296	2 500
5	80 483	144 869	2 500
6	57 758	103 965	2 500
7	69 120	124 417	2 500
8	59 652	107 373	2 500
9	42 608	76 695	2 500
10	50 183	90 330	2 500
11	48 290	86 921	2 500
12	35 980	64 765	2 500
13	18 937	34 087	2 500
14	11 362	20 452	2 500
15	11 362	20 452	2 500
16	73 713	132 683	2 500
17	51 427	92 569	2 500
18	51 427	92 569	2 500
19	61 713	111 083	2 500
20	52 285	94 112	2 500
21	51 427	92 569	2 500
22	52 285	94 112	2 500
23	61 713	111 083	2 500
24	54 856	98 741	2 500
25	58 284	104 912	2 500
Total	**1 222 197**	**2 199 954**	
Maximum / year	***80 483***	***144 869***	

8. Mining

Mining procedure

The mining process will be smooth and planned for a period of approximately 25 years. The first mining block 3, due to its current height, will be mined during the first four years (following 2 pictures). The remaining mining blocks 1 and 2 are higher and the mining progress will be slower (more pictures).

Picture no. 8: Mining process after the 1st year



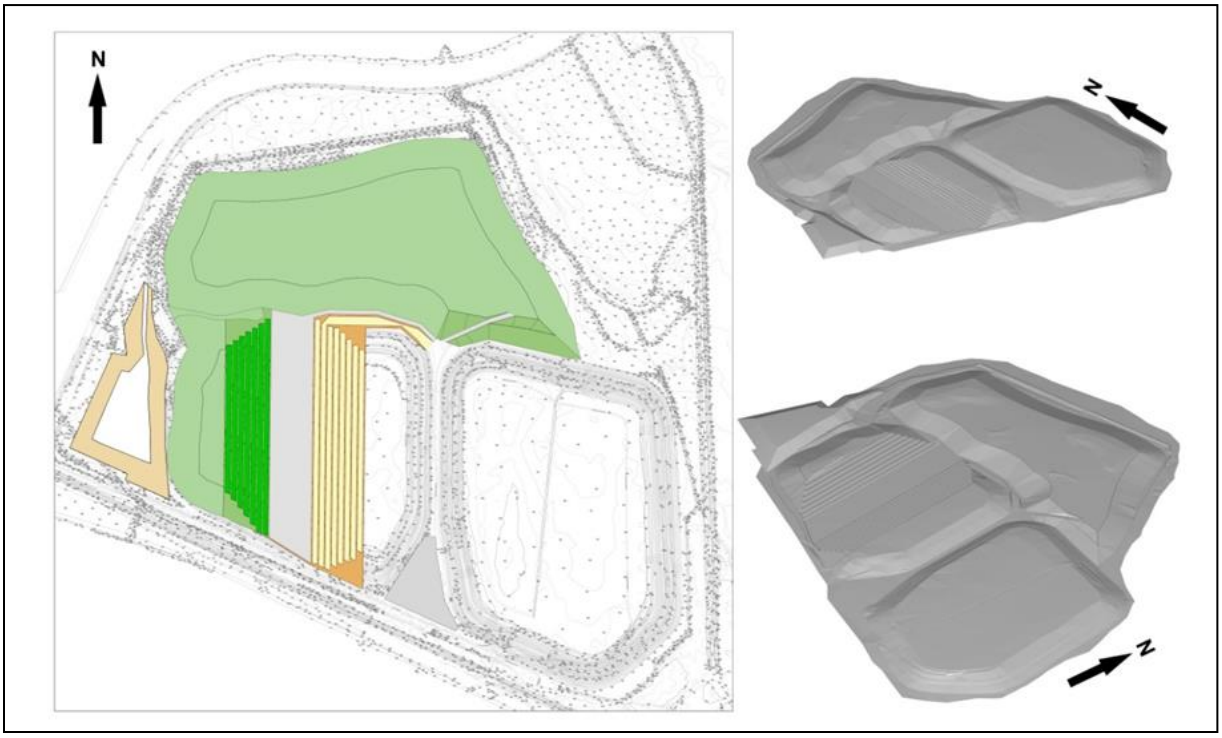
Explanatory notes:

- *yellow area – area of ongoing overburden and mining*
- *light green area – the area is already being rehabilitated with ongoing reclamation*
- *dark green area – area of ongoing redevelopment*
- *beige area – dump area (in the west there is a deposit of overburden materials from the plant area)*
- *dark grey – paths and workspaces*
- *light grey colour – current state of the terrain*

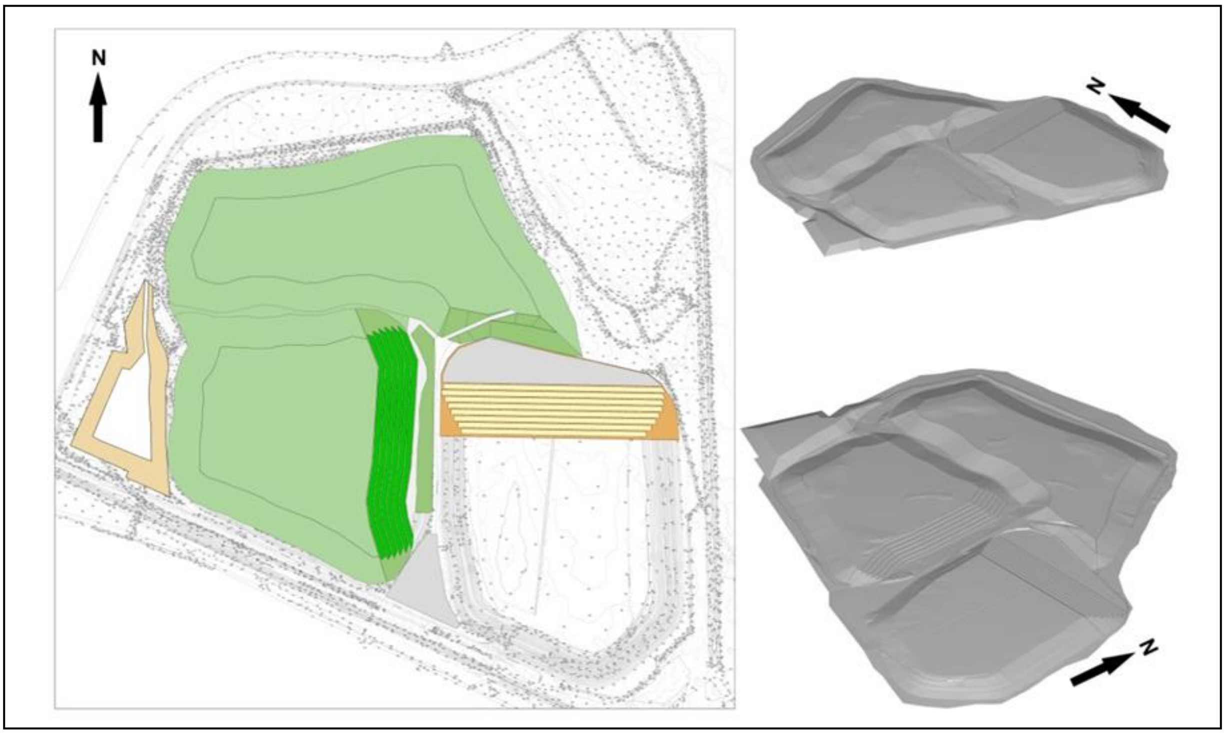
Picture no. 9: Mining process after the 3rd year

Picture no. 10: Mining progress after year 6

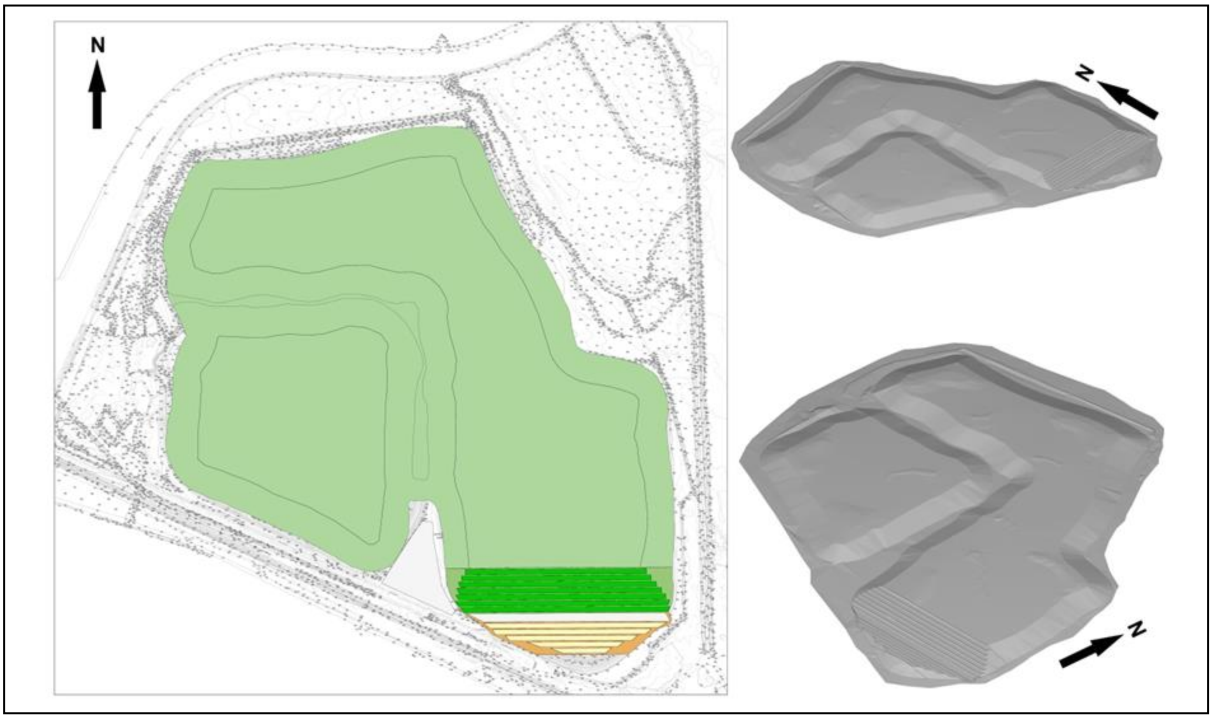
Picture no. 11: Mining process after year 12



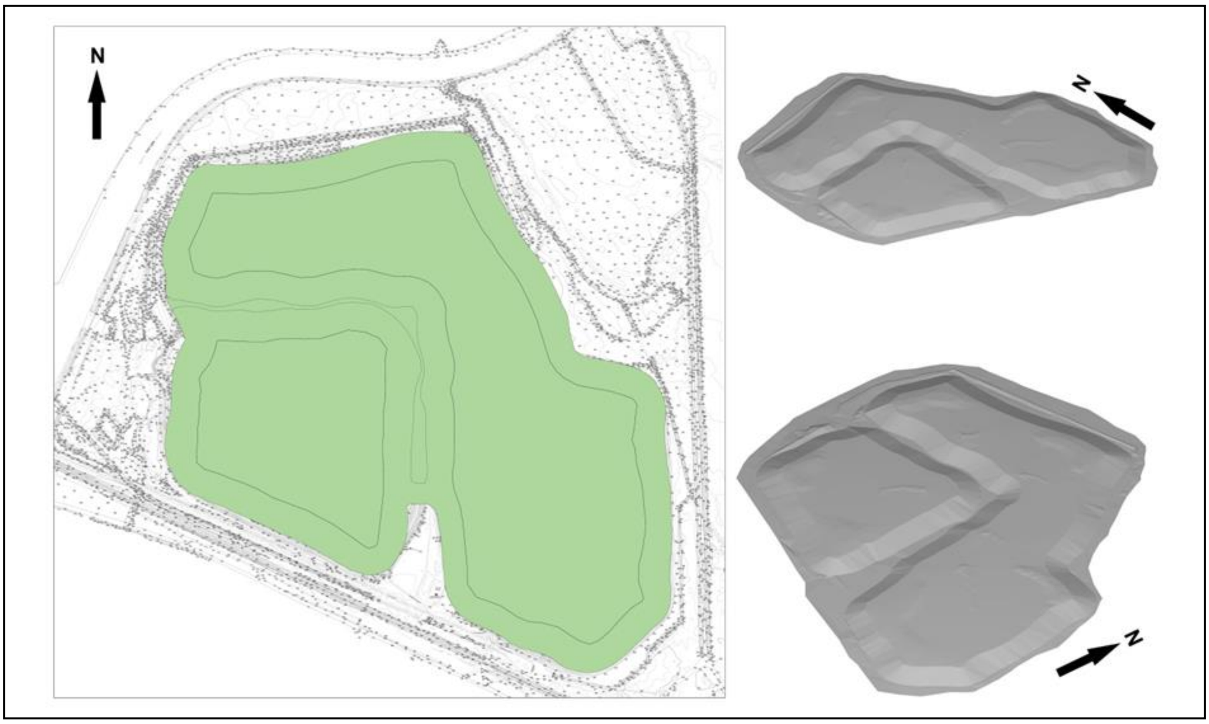
Picture no. 12: Mining process after the 18th year



Picture no. 13: Mining process after the 24th year



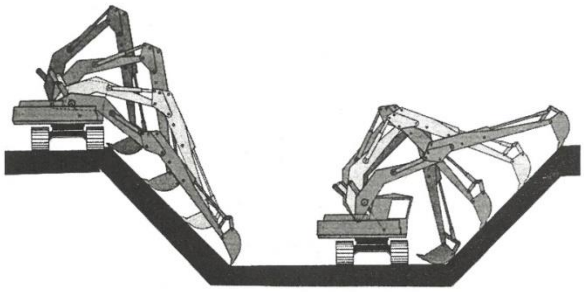
Picture no. 14: Completed mining and remediation of the area



The choice and description of the mining method

Mining in footbridges using excavators and trucks (dumpers) was chosen as the main mining method. This entails a bottom-up mining approach, where the excavator will be located at the foot of the mining cut, and the truck will also be located at the foot of the mining cut.

Picture no. 15: Scheme of the mining method



Explanatory notes:
-Excavator left: top-down mining
-Excavator right: bottom-up mining, ***mining method used***

The height of the mining cut will be 3 m and the slope will be 1:1 (45°). The distance between the working footbridge will be at least 12 m. With a mining cut height of 3 m, it will not be possible to extract slushy materials (GT3). When reducing the height of the mining cut to 2 m, the stability of the mining cut is already sufficient, but only when the excavator is positioned at the foot of the mining cut.

Mining can be affected by climatic conditions. Laboratory tests of the material show that significant moistening (e.g. during periods of prolonged precipitation) leads to slushing of the material and deterioration of geotechnical properties. This phenomenon does not apply to sandy material GT1, which is sufficiently permeable to water, and due to the prevailing sandy component, its properties will not be impaired.

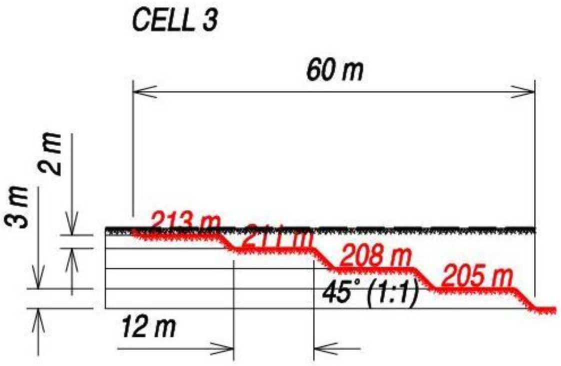
The slushy material of the GT3 will already have a high degree of saturation by itself and will probably not be able to hold more water. The deterioration of geotechnical parameters during heavy precipitation activity thus concerns only the GT2 powdery material. There are several possible ways to resolve this issue:

- reducing the height of the mining cut,
- reducing the slope of the mining cut,
- temporary cessation of mining,
- adapting the mining process (mining during the drier period), the type of mechanization and transport.

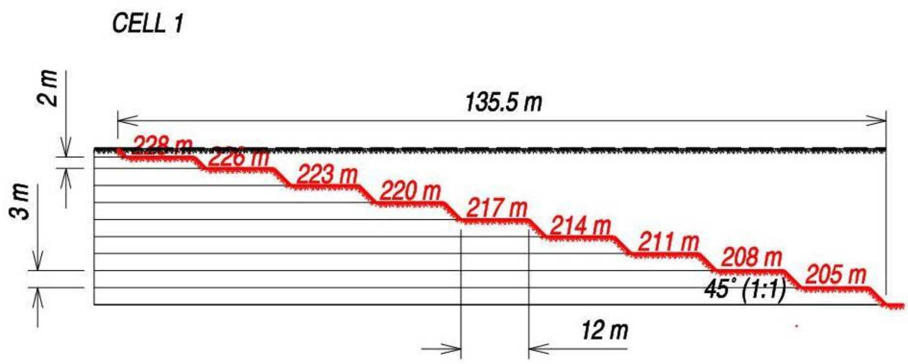
A similar mining procedure can be chosen in places with a surface load capacity below 95 kPa (the lowest value of a recommended truck).

The following Pictures show the basic parameters of overburden and mining cuts for different mining blocks (mining blocks 3, 1 and 2).

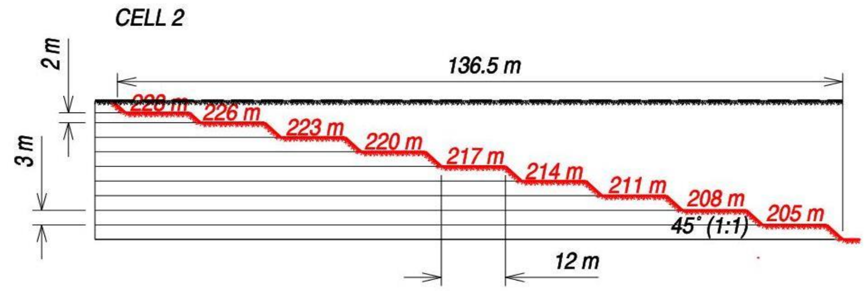
Picture no. 16: Overburden and mining cut of mining block 3



Picture no. 17: Overburden and mining cut of mining block 1 (CELL 1)



Picture no. 18: Overburden and mining cut of mining block 2 (CELL 2)



Calculation and assessment of surface load capacity in the planned mining area

The bearing capacity of the mining surfaces can be directly deducted from the results of the core drilling survey, which was carried out in the area of all three depots in 2018. One of the direct outputs of the measurement was the load capacity value of the material.

The measured values ranged from 80 to 250 kPa, but very low (50 kPa) or, on the contrary, high (600 kPa) load capacity values were also found. These values were rather rare. Generally speaking, the load capacity of the GT1's sandy positions ranges from 150 to 250 kPa (but sometimes over 300 kPa), depending on the amount of fine-grained material. The load capacity of dusty positions is approximately between 120 – 220 kPa. Slush, wet positions have load capacity values between 80 – 110 kPa, but positions with load ratings between 65 – 75 kPa can also be found.

Dusty and sandy positions are sufficiently bearable for the movement of suitable heavy equipment. However, the slushy positions of the GT3 will be mostly unbearable even for ordinary heavy equipment. Therefore, in these slushy positions, crawler excavators with a load capacity of 65 kPa will be used during mining.

It is necessary to pay attention to the selection of suitable mining mechanization with regard to the results of the bearing capacity of the surface in the planned mining area. It will depend on the type of mechanization, the width and size of the tires and the maximum load of the mining machine.

9. Transport of raw material for preparation and working cycles, used mechanization

The extracted raw material will be transported by trucks (dumper, 40 t) to the raw material storage facility located in the area between cells 1 and 2.

The provision facility is designed to perform three functions:

- Receipt and storage of raw materials
- Raw material pulping
- temporary storage of recovered material (mining waste, mixture of NMT and LR)

The capacity of the raw material reservoir will correspond to the three-day operation and the capacity of the mining waste reservoir will correspond to approximately five days' operation of the processing plant.

The raw material in the facility will be taken by a front loader and dosed into a hopper, from which it will be transported by screw conveyors to two drum sieves, which are used to separate coarse impurities such as roots, stones and foreign materials. Due to the physical properties of the raw material, wet sieving using recycled process water will be used.

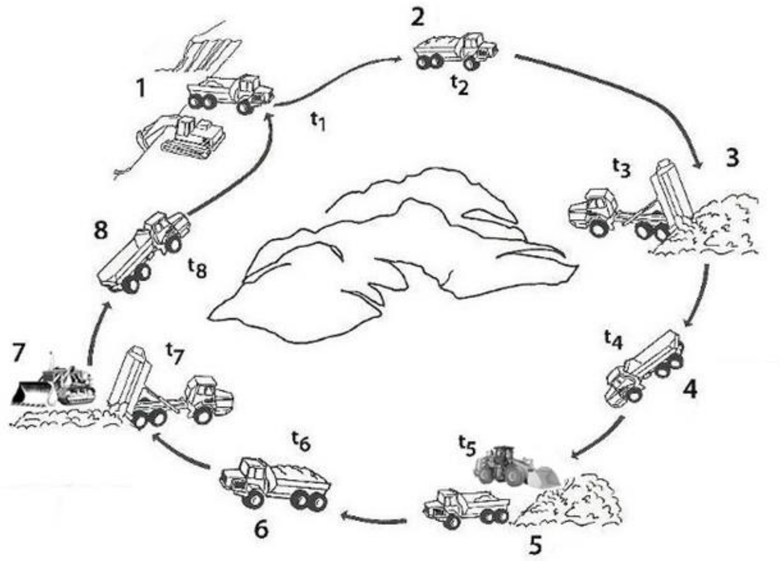
The sieved raw material will be mixed in the pulping tanks with recycled process water to form a slurry. The resulting slurry will be pumped through a pipeline located in a technological bridge (B42) leading across the railway corridor and the Chvaletice-Přelouč road to the storage tank located in the processing part of the plant.

Calculation of duty cycles and number of mining mechanisms

Duty cycle (Picture no. 19) of mining mechanisms has the following sections (1 – 8) and times (t1 – t8):

- section 1: process of loading mined raw material in time t1,
- section 2: Traffic, fully loaded lorry, journey beyond t2,
- section 3: handling during unloading, unloading of extracted raw material from time t3,
- section 4: Traffic, empty lorry, travel in time t4,
- section 5: process of loading mining waste in time t5,
- section 6: Traffic, fully loaded lorry, journey in time t6,
- section 7: handling on unloading, unloading of mining waste in time t7,
- Section 8: Traffic, empty lorry, travel in t8 time.

Picture no. 19: Duty cycle description



A variant using exclusively trucks is considered.

The following values were used as a basis for the calculations:

- Off-road laden truck speed: 12 km/h,
- Off-road empty truck speed: 17 km/h,
- Speed of the loaded truck on paved roads: 35 km/h,
- Number of working days: 250 days,
- Number of real hours in mining per shift: 7 hrs,
- Number of shifts per working day: 2 shifts,
- Loading time of a truck by one excavator: 150 sec,
- loading time of the truck with one front wheel loader: 90 sec,
- Handling time and unloading of the truck: 30 sec.

In the Feasibility Study and Mining Study, a selection of specific mining and auxiliary mechanisms was also carried out. The assembly was chosen due to its capacity, the bearing capacity of the subsoil of the existing terrain and the terrain of dumps built as part of the remediation of the area.

Basic assembly for mining:

- 2x excavators (type CAT 374FL, bucket volume 2,9 m3)
- 4x articulated dumper (type CAT 745)

Basic set for subsequent remediation work, creation of mining waste dumps:

- 2x wheel front loader (type CAT 972M)
- 3x dozer (type CAT D6N)
- The material will be brought in by dumpers, who will also transport the excavated material

Auxiliary mechanization for both processes, mining and remediation consists of the following mechanization:

- 1x grader (type CAT 160)
- 1x vibrating roller (type CAT CP12)

- sprinkler truck
- other mechanization (forklift in the workshop, truck, service van, transport tank for fuel)

Table No. 8: Selection of mechanisms, number, type, consumption

Use and number of machines	Unit	Total
CAT 374 excavator		
Operating hours/year	h	**49 626**
Number of MAX machines	#	**2**
Diesel consumption	l	**1 836 173**
CAT 972M loader		
Motohours/year	h	**55 549**
Number of MAX machines	#	**2**
Diesel consumption	l	**905 448**
CAT 745 dumper		
Motohours/year – total	h	**218 234**
Number of MAX machines	#	**4**
Diesel consumption	l	**7 482 279**
Bulldozer D6N		
Motohours/year	h	**81 523**
Number of machines	#	**3**
Diesel consumption	l	**2 038 069**
Grader CAT 160		
Motohours/year	h	**32 130**
Number of machines	#	**1**
Diesel consumption	l	**642 600**
Vibrating cylinder CAT CP12 GC		
Motohours/year	h	**53 550**
Number of machines	#	**2**
Diesel consumption	l	**669 375**
Other/auxiliary equipment		
Diesel consumption	l	**7 500**

Note:
The specific type of mechanization is given only as an example illustrating in particular the performance parameters of the machine; There may be similar mechanisms of the same or other manufacturers.

In the calculations, a margin exceeding 20 % was included in the calculation. This reserve will be used for overburden work as well as for possible increased mining and transport to replenish the raw material reservoir after a climatically unfavorable period when mining will have to be stopped or limited due to weather conditions.

The capacity of mining and return transport is calculated so that within 5 working days (1st and 2nd shift) the required amount of material for the whole week of operation (7 days, 3 shifts) is provided. If, due to climatic or other conditions, there is a temporary decrease in mining/storage capacity, the missing amount of material will be supplemented by increased mechanization performance in the following days (calculated capacity reserve of 20%). In exceptional cases, e.g. during periods of prolonged heavy rainfall, the missing amount of material would be replenished during extraordinary shifts organised on non-working days or rest. Even in this case, mining and storage would be carried out in one, maximum two working shifts.

Replenishment of the reservoir will not affect the annual output of mining. Replenishment will replace the previous short-term outage. At the same time, the increased daily output will not affect operating hours or fuel consumption.

The mining capacity is based on a balance of 26,644,344 t of recoverable reserves of raw material (manganese tailings) in the dry state, the natural humidity of the deposit is about 21%. This amount of manganese tailings will be extracted in about 25 years, which represents an annual extraction of about 1,065,770 t (dry raw material). After taking into account the moisture content of the raw material, the average extraction is about 1,289,580 tons of material/year. Basic capacity data are given in the following table (Table No. 9).

Table No. 9: Annual mining base capacity data

Year	Raw material		
	t/year, dry	t/year, wet	max. t/day wet
-1	0	0	0
0	0	0	0
1	718131	861757	5700
2	1112500	1335000	5700
3	1106900	1328280	5700
4	1070250	1284300	5700
5	1012138	1214565	5700
6	1040279	1248335	5700
7	1079722	1295666	5700
8	1096946	1316335	5700
9	1016181	1219417	5700
10	1010000	1212000	5700
11	1016139	1219366	5700
12	1016685	1220022	5700
13	906815	1088178	5700
14	833643	1000371	5700
15	1055843	1267011	5700
16	1085131	1302157	5700
17	1129690	1355628	5700
18	1167828	1401393	5700
19	1236713	1484055	5700
20	1195889	1435067	5700
21	1184332	1421198	5700
22	1235765	1482918	5700
23	1183309	1419971	5700
24	1136531	1363837	5700
25	996988	1196385	5700
Total	**26644344**	**31973213**	
Maximum / year	***1236713***	***1484055***	

10. Transport and disposal of mining waste

Method of storage

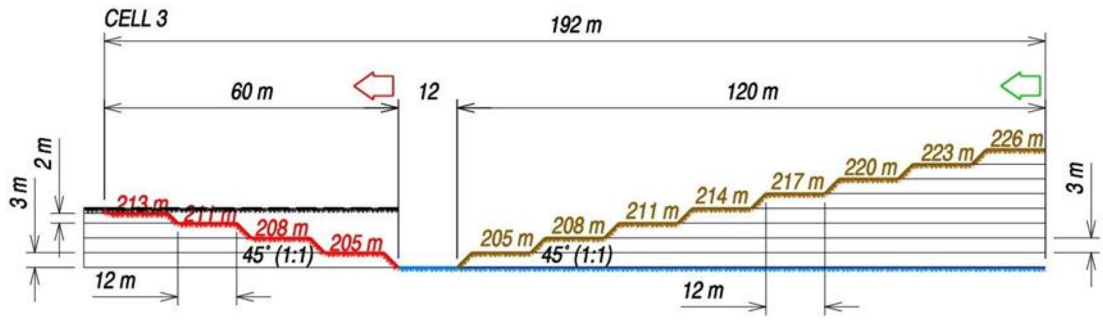
The basic method of remediation and reclamation consists in the re-deposit of material from manganese tailings treatment, ensuring the safety and stability of the newly modeled terrain and performing biological reclamation.

In terms of legislation, the material from the treatment is characterized as mining waste according to Act No. 157/2009 Coll., on Mining Waste, as amended. The inclusion here is based on the opinion of the Czech Mining Authority (ČBÚ) here on 10.7.2019, ref. SBS20517/2019/ČBÚ-21.

The stored material will consist of two components, which will be transported to the mining area in a pre-mixed state directly from the production plant. For the purpose of the mining study, two samples labeled NMT (non-magnetic) and LR (leaching residue) were submitted for analysis. Basic classification analysis and compaction tests (Proctor Standard), IBI (Immediate Bearing Index) and CBR (California Bearing Ratio) were performed on both samples. Furthermore, a mixture of samples was created from the remains of the samples in a ratio of 55:45, the sample was marked as NMT/LR. On this sample, granular classification of the material was carried out. It is believed that this mixed material will be the main component of dumps. Details of its properties are given in Chapter B.II.7.

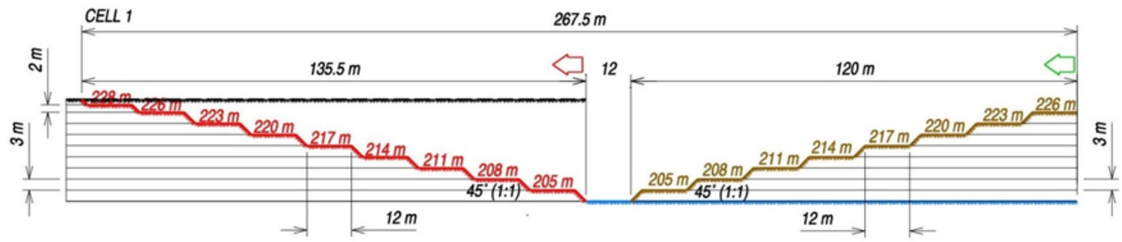
Mining waste will be deposited in a layered repository. A truck (dumper) unloads the mining waste in front of the upper edge of the footbridge and the dozer then adjusts the area to the plane. The area will be compacted by the travel of dumpers and dozer. The distance between the working footbridge will be at least 12 m. The minimum length of the open area will vary depending on the height of the mining block. This is described in detail in the following pictures.

Picture no. 20: Working distance between mining and remediation in mining block 3



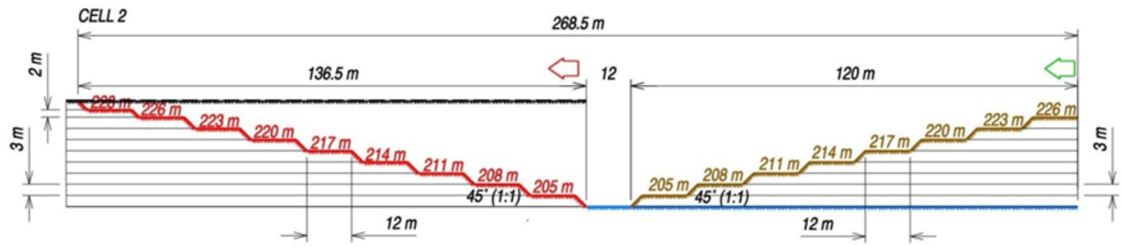
Explanatory notes:
- *Red arrow – direction of overburden and mining*
- *Green arrow – direction of remediation progress*

Picture no. 21: Working distance between mining and remediation in mining block 1



Explanatory notes:
- *Red arrow – direction of overburden and mining*
- *Green arrow – direction of remediation progress*

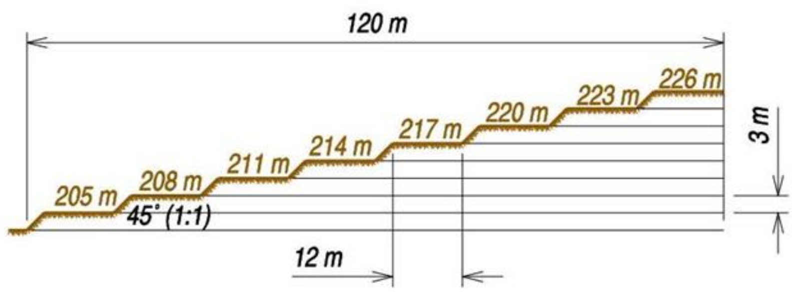
Picture no. 22: Working distance between mining and remediation in mining block 2



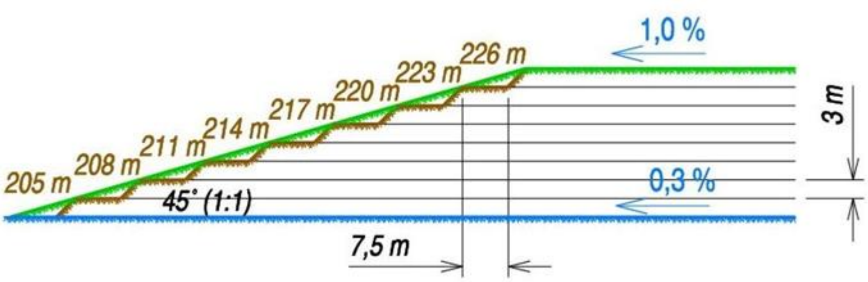
Explanatory notes:
- *Red arrow – direction of overburden and mining*
- *Green arrow – direction of remediation progress*

The deposition of mining waste in layers, indicating a minimum working distance of 12 m for the footbridge, is described in the picture (Picture no. 23). In the picture (Picture no. 24) describes the procedure for completing the shaping of a dump from mining waste.

Picture no. 23: Cut when depositing mining waste in layers



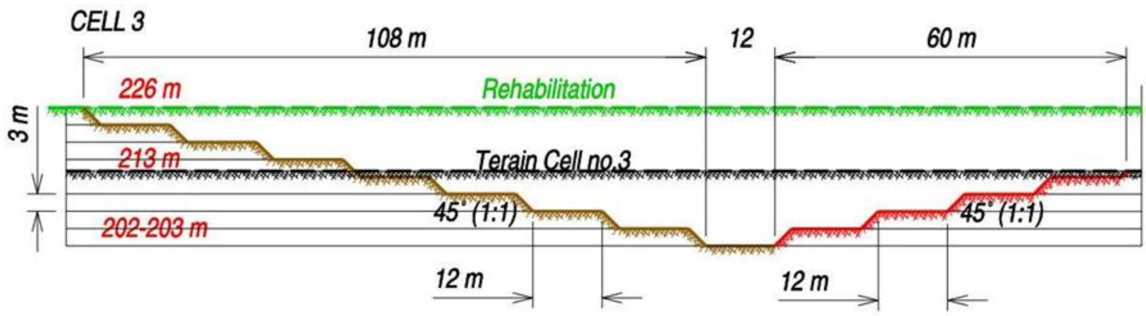
Picture no. 24: Cut when depositing mining waste in layers when terminating the shape of the dump



Explanatory notes:
- *Blue chute – direction of drainage gradient*

- *Green arrow – direction of remediation progress*

Picture no. 25: Illustrative section of mining, deposition of mining waste and the resulting height of the reclaimed dump in mining block 3



Explanatory notes:
- *Black line – current terrain*
- *Red line – ongoing mining*
- *Brown line – ongoing dumping of mining waste*
- *Green line – completed reclamation*
- *Green arrow – direction of remediation progress*

The total volume of deposited mining waste (wet) will be approximately 34.6 million tonnes. The amount of mining waste to be deposited in each year is shown in the table below. At the same time, it also includes a lot of material from the temporary deposit, which will be used for the remediation of the repository (base and top layers).

Table No. 10: Basic annual capacity data for remediation and reclamation

Year	Mining waste			Landfill (material from the construction of the processing plant)			
	t/year, dry	t/year, wet	max. t/day wet	Stored quantity m3	Used m3	max. m3/day, wet	.max. t/day, wet
-1	0	0	0	650000	0	0	0
0	0	0	0	590000	60000	1000	1550
1	746856	933570	5700	565000	25000	1000	1550
2	1157000	1446250	5700	540000	25000	1000	1550
3	1151176	1438970	5700	505000	35000	1000	1550
4	1113060	1391325	5700	470000	35000	1000	1550
5	1052623	1315779	5700	430000	40000	1000	1550
6	1081890	1352362	5700	390000	40000	1000	1550
7	1122911	1403638	5700	350000	40000	1000	1550
8	1140824	1426030	5700	310000	40000	1000	1550
9	1056828	1321035	5700	285000	25000	1000	1550
10	1050400	1313000	5700	260000	25000	1000	1550
11	1056784	1320980	5700	240000	20000	1000	1550
12	1057353	1321691	5700	220000	20000	1000	1550
13	943087	1178859	5700	200000	20000	1000	1550
14	866989	1083736	5700	180000	20000	1000	1550
15	1098077	1372596	5700	160000	20000	1000	1550
16	1128536	1410670	5700	140000	20000	1000	1550
17	1174877	1468597	5700	120000	20000	1000	1550

Year	Mining waste			Landfill (material from the construction of the processing plant)			
	t/year, dry	t/year, wet	max. t/day wet	Stored quantity m3	Used m3	max. m3/day, wet	.max. t/day, wet
18	1214541	1518176	5700	100000	20000	1000	1550
19	1286181	1607727	5700	80000	20000	1000	1550
20	1243724	1554655	5700	60000	20000	1000	1550
21	1231705	1539631	5700	40000	20000	1000	1550
22	1285195	1606494	5700	20000	20000	1000	1550
23	1230641	1538301	5700	0	20000	1000	1550
24	1181992	1477490	5700	0	0	0	0
25	1036867	1296084	5700	0	0	0	0
Total	**27710118**	**34637647**			**650000**		
Maximum / year	***1286181***	***1607727***			***60000***		

Calculation and assessment of surface load capacity in the planned area of dumps

The results of the analysis of the properties of the recycled material showed that the mixed material will have the properties of clay with low plasticity. Geotechnical parameters are given in the table below (Table No. 11).

Table No. 11: Geotechnical parameters of NMT/LR material based on classification according to ČSN 73 6133

Soil according to ČSN 73 6133	N	β	γ kN.m3	E_{def} MPa	c_u kPa	φ_u (°)	c_{ef} kPa	φ_{ef} (°)	Rdt* kPa
Material NMT	0,40	0,47	17,0	6-8	80	0	8-16	17-21	60-143
LR material	0,40	0,47	17,0	3	45	0	8-16	19-23	70-166
Material NMT/LR	0,40	0,47	17,0	6-8	80	0	12-20	17-21	60-143

Explanatory notes:

ν	*Poisson number*	c_u	*Total cohesion*
γ	*volumetric weight*	c_{ef}	*Consistency effective*
β	*Conversion factor*	φ_u	*internal friction angle total*
E_{def}	*Transformativeness module*	φ_{ef}	*internal friction angle effective*

** load capacity Rdt calculated over an area of 1 m² for average values c_{ef} 8-16 kPa and φ_{ef} 17-21° for soft consistency, with a density of 17,0 kN/m3*
the volumetric weight has been adjusted for the material

From the last column of the table, it is clear that the load capacity range is between 60 kPa and 143 kPa, the average load rating is around 101 kPa. This load carrying capacity is sufficient for the movement of suitable heavy equipment.

Problematic is the deterioration of the geotechnical parameters of recycled material in the case of intensive moistening, when the material becomes very unbearable. In the event of heavy rainfall, the material may become temporarily unbearable until it drains/dries.

Traffic routes

Trucks (dumpers) will be used to transport the extracted raw material and return the mining waste to the site of the ongoing remediation. The main quarry road and purposeful, operational, quarry roads will be used for transport.

During one truck (dumper) journey, it will be transferred from the place of unloading of mining waste to the place of loading of raw materials. The distance of these places depends on the individual years of operation of the quarry. The following Pictures show the procedure with these routes:

- Route 1: from loading of raw material to the place of unloading,
- Route 2: from the place of unloading of mining waste to the extraction site,
- Route 3: from the loading of mining waste to the place of unloading of mining waste
- Route 4: from the unloading of the raw material to the loading point of the mining waste,
- Route 5: removal of overburden materials created during the construction of the plant.

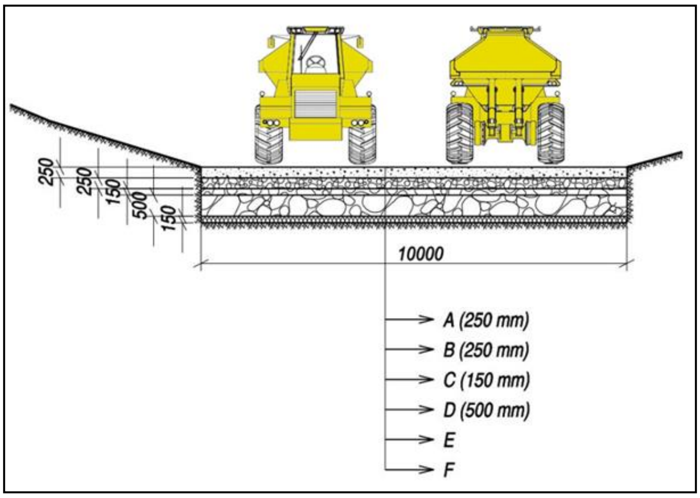
The traffic pattern in selected years of mining is shown in the pictures (Picture no. 26 only Picture no. 31).

Picture no. 26: Transport scheme in the 1st year

Explanatory notes:
- *yellow area – area of ongoing overburden and mining*
- *light green area – the area is already being rehabilitated with ongoing reclamation*
- *dark green area – area of ongoing redevelopment*
- *beige area – dump area (in the west there is a deposit of overburden materials from the plant area)*
- *dark grey – paths and workspaces*
- *light grey colour – current state of the terrain*

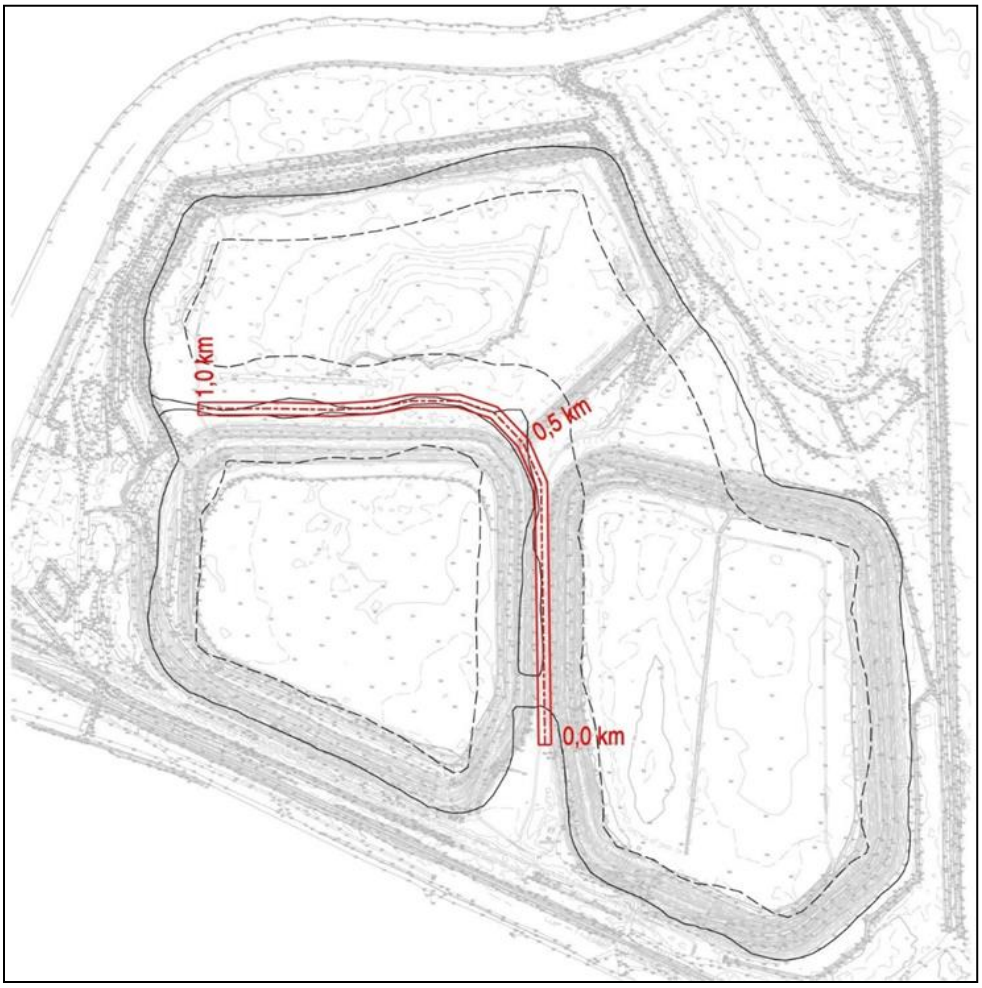
). Its service life will be 25 years. Communication is conducted on a plane. The location of the main quarry road is shown later in the text (Picture no. 33).

Picture no. 32: Composition of layers of the main quarry road



Explanatory notes:
A – cement-concrete layer
B – gravel underlay, gravel
C – base layer sandy loam, gravel
D – quarry stone
E – underlying insulation layer for drainage of road bases
F – original terrain

Picture no. 33: Diagram of the main quarry road



Purpose-built quarry roads will be created continuously with the progress of mining, respectively the process of remediation. They will have a maximum slope of 10% and a width of up to 10 m. They will allow the passage of two trucks side by side.

Purpose-built quarry roads will not be paved. They will be continuously leveled by dozer or grader. Trucks (dumpers) can drive on ruts and thus continuously adjust the route.

To strengthen the top layer of the dump or quarry paths, it is possible to use a material increasing the bearing capacity of the base. Especially in places where it will be necessary to increase the bearing capacity of the substrate without costly stabilization measures, it is possible to use, for example, a stabilizing geogrid.

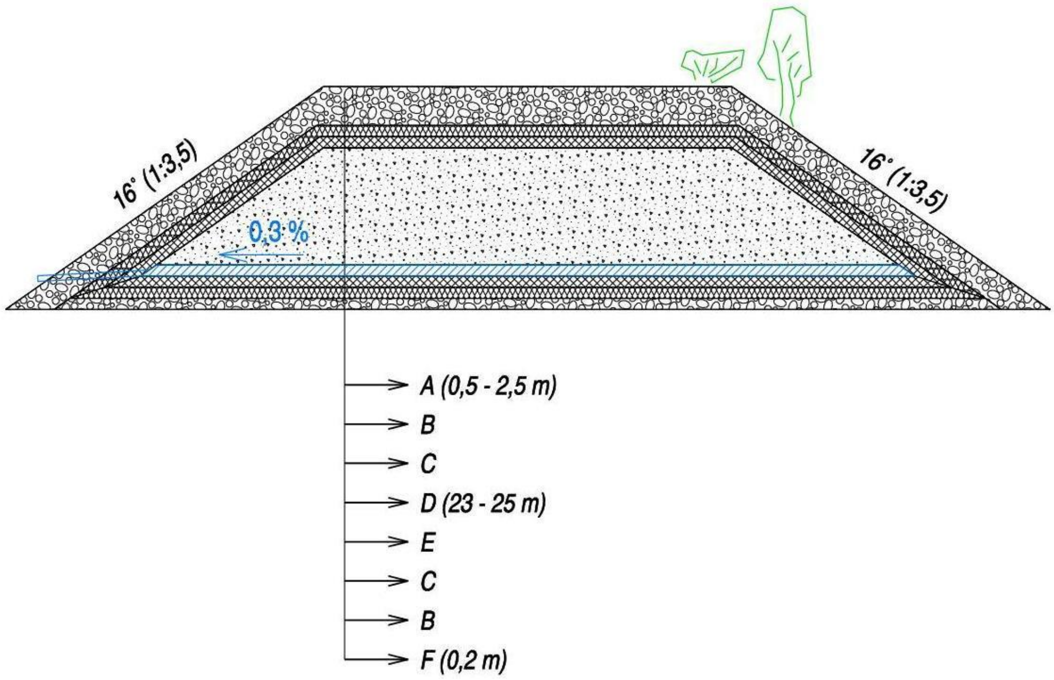
11. Remediation and reclamation

Shape and securing of hoppers

The internal dump will be created by gradual deposition of mining waste directly in the area of the current tailings. The design assumes that there will be two bodies separated by the space of the main quarry road. Solids will be shaped into the final projected form directly during the material deposition. Details on the shape of the dumps are given in the Draft Comprehensive Remediation and Reclamation Plan (Annex No. 8)

The composition of the individual layers of the dump is shown in the following picture. Each hopper will be insulated in the form of a closed pocket.

Picture no. 34: Composition of layers of insulated internal dump



The composition of the dump layers is as follows:
- A: top layer of the dump, landfill of clay and fertilizable layers
- B: geotextiles
- C: insulation layer, certified insulation material
- D: mining waste
- E: main drainage system
- C: insulation layer, certified insulation material
- B: geotextiles
- F: aggregates

The dumps will be formed gradually, by depositing mining waste. They will be built on pre-prepared areas that will be paved, insulated and drained. Preparation of the area under the dump will begin smoothly after the completion of the mining work.

The lower layer of the dump area will be made of aggregate. The area will be aligned in an inclined plane with a slope of 0.3% (gradient of the drainage system). The layer will have a thickness of at least 0.2 m.

The aggregate layer will be covered with geotextiles and an insulating layer will be laid on it. The insulating layer will consist of a material with insulating properties with a certificate, or an insulating foil will be used.

A main drainage system will be created on the lower insulation layer, which will capture contaminated water from the mining area as well as from the mining waste dump area. The main drainage system will then be used as an observation monitoring system for the violation of the upper insulation of newly built dumps. Details on drainage are given in Part B.III.2.

The top insulating layer of the dumps will be covered with geotextiles, which will be overlaid with overburden from the deposit with soils from the construction of the plant with a minimum thickness of 0.5 m (in the case of establishing grass-herb communities) to 1.5 – 2 m (in the case of planting trees) and subsequently covered with the top humus layer.

Work on the creation of insulation layers will be carried out by subcontractors. Laying of a special insulating layer, or insulating film, is carried out by specialized companies with certification.

Reclamation objectives

The aim of remediation and reclamation is to create a near-natural area with high biodiversity and stability, which will be able to be used for recreational and sports activities.

In order to increase the biodiversity and overall diversity of the environment after changes in the shape of the relief related to the transfer of matter within the deposit, it is necessary to create such conditions that will lead to the creation or strengthening of ecological, aesthetic, water management and landscaping functions in the area of interest.

From the point of view of nature conservation and the above-mentioned functions, the SaR proposal worked with the following basic points:

- the creation of terrain depressions as a living aquatic ecosystem;
- to ensure the greatest possible water subsidy, shape the hopper area as one micro-basin (most areas with a minimum slope with runoff in the direction of the water features);
- a more detailed morphology of the terrain is suitable for more rugged, taking into account the subsequent use;
- For the proper thriving of planted tree species, a minimum layer of fertilizable soils of 1.5 – 2 m is necessary and then the top humus layer.

At the same time, the objectives of remediation and reclamation were chosen to respect the document "Biodiversity Protection Strategy of the Czech Republic for the period 2016–2025 (Ministry of the Environment, 2016)", which defines priorities in the field of protection and sustainable use of biodiversity in the Czech Republic. These include, for example:

- maintain or increase the extent of natural habitats;
- improve landscape structure;
- improve the permeability of the landscape to biota;
- reduce pollution and improve physico-chemical water quality;
- increase the retention capacity of the landscape;
- increase the share of reclamation of areas after mining by spontaneous succession.

Biological reclamation

The proposed remediation and reclamation, facilitated by modelling of the terrain as one micro-basin will ensure the accumulation of rainwater in the area of shallow terrain depressions and thus allow the formation of wetland communities. Simultaneously, the varied topography of the terrain, with its rugged features, will enhance the diversification of site conditions. In combination with subsequent biological reclamation (forest-free areas, forest, scattered greenery), this strategy will contribute to higher biodiversity in the area. The proposal respects the proposed measures to minimise impacts on fauna, flora and ecosystems.

The following types of biological reclamation are proposed in the area of interest:

- A – areas of grass-herb communities (65.34 ha)
- B – continuous planting of trees (35.71 ha)
- C – shrubs and loose planting (22.61 ha)
- D – dry polder
- E – succession areas without humic substrate (3.62 ha)
- F – forest park (1.38 ha)
- G – terrain depression – periodically flooded waters (0.31 ha)

Grass-herb communities will be the predominant type of reclamation in the area of interest. They will be created outside areas A and in parts of other areas (B, C and D). In the case of area B, 20% of their area will be grassed, in the case of area C 80% of the area. At area D, everything will be grassed except for the terrain depressions, their immediate surroundings and paths.

The desirable mosaicism of the landscape will be ensured by the island-like planting of trees and areas with shrubs and loose planting of trees.

All vegetation establishment will be carried out immediately after the completion of remediation work – leveling of the terrain at a suitable time of year (spring, autumn).

The individual types of reclamation represent:

A — Areas of grassland communities

Grass-herb communities will be established in 100% of the defined area. The proposed species composition corresponds to the recommended composition of the mixture for bi and/or fir oak and elm oak (Neuhäuslová, 1998).

B – Area planting of trees

In these areas, there is a vision of creating a loose, rather park-like planting of trees. Trees will be planted in groups and solitary with a total coverage of about 80%, between planting on the remaining area (about 20%) permanent grasslands will be established.

C – Shrubs and loose planting

In this area, there is again a combination of planting trees on 20% of the area with the establishment of a grass-herb community on 80% of the area. Hawthorn can also be supplemented with other thorny shrubs such as blackthorn or rosehip, which are recommended as a measure for shrike and meadow bunting.

D – Dry polder

Area designated for water collection from the micro-basins of dumps, where precipitation will be drained from the territory by the main channel forming the valley of the dry polder leading in the south-west direction. Moderate depressions (0.5 – 1 m) with periodic water (G) and allowing the development of wetland communities will be deepened along its route. In the area outside the terrain depressions and their immediate surroundings, path and bed of the central watercourse will be grassed in the same way as area A.

E – Succession areas without humic substrate

Loamy sand enclaves left to natural succession. Effort to get closer to the vegetation of the slopes of xerothermic grassland communities, suitable location on sunny drier parts.

F – Forest park

The existing vegetation of self-seeding character will be used as the basis for the creation of a forest park. Suitable pruning of the stand is the effort to achieve loose forest stands suitable for increased movement of people.

G – Terrain depression – periodically flooded waters

Field depressions will not be biologically reclaimed – no aquatic or other plants will be planted here, and development will be left to natural succession processes. For the purpose of partial shading and reinforcement it is possible to plant to a small extent the bank parts of water elements willows using willow cuttings.

c) Quarry facilities

Description of facilities

The extracted raw material will be initially processed in the background of the quarry, specifically in the southern part of the mining area between tailings cell No. 1 and 2. After extraction, the raw material will be loaded onto trucks, which will take it to the tipping point of the covered container of the mined raw material, where it will be transferred to a pulping tank (B1).

The quarry background will be situated in the area between heap No. 1 and No. 2 in the southern area of the mining area. The quarry facilities will consist of social, technical and technological objects that will be used for the operation, maintenance, initial treatment and social background of the quarry employees and management.

These are the following objects, files, and faces:

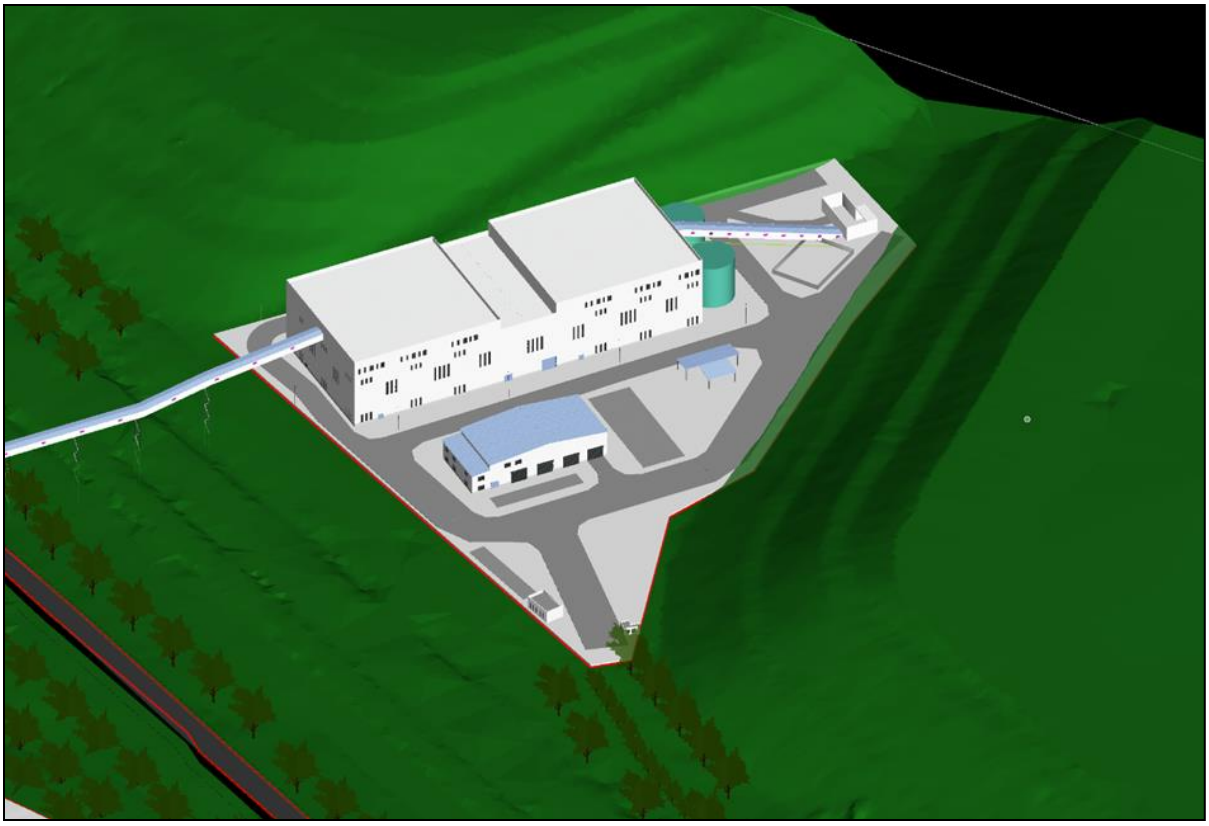
- Object a) Settling tank for mine water
- Object b) Diesel filling station
- Object c) Parking for trucks
- Object d) Workshop and quarry facilities
- Object e) Parking A
- Object f) Parking B
- Object g) Temporary storage of material
- Object h) Sewage treatment plant
- Object j) Washing unit for mining mechanization

- Object k) Gatehouse
- Object m) Mine water tank
- Object B1) Raw material reservoir of the pulping station

A diagram of all objects in the area of the quarry background is shown in the following pictures (Picture no. 35 and Picture no. 36) and a list of individual objects, including their descriptions, is given in the table (

Table No. 12).

Picture no. 35: Spatial distribution of buildings in the quarry background, view from the SE



Settling tank for mine water (Object a)

It is a reservoir for collecting mine water. The reservoir is situated in the northern part of the quarry.

Petrol station, diesel (Object b)

The fuel (diesel) filling station consists of an above-ground double-jacket fuel tank with an expected volume of 20,000 l. The tank is located in a leak-proof area. The volume of the reservoir is dimensioned for the number of deployed mining mechanisms in the quarry and its replenishment should be on a weekly basis.

Oils and lubricants will be stored in a dedicated warehouse. The warehouse is equipped with equipment against leakage of hazardous and polluting substances. The pumping station and the oil and lubricant store meet the safety regulations valid in the Czech Republic. The fuel tank protection zone is located 12 m from other objects.

Parking spaces for mining machinery (Object c)

It is a parking space for mining mechanisms, especially trucks (7 cars). The dimensions of the individual parking spaces fully comply with the dimensions of the proposed mining mechanisms.

Social and administrative building – Workshop and facilities of the quarry (Object d)

It is a two-storey building, which includes offices, changing rooms and sanitary rooms, a food preparation room with a dining room, a meeting room and technical rooms. The building is designed for 30 to 40 employees, who will work in two shifts. The building will be brick, insulated, heated and air-conditioned.

Parking spaces for cars (Objects e and f)

An open parking area designed for 20 cars is allocated for both employees and visitors. The width of one parking space is 2.7 m and the length is 5.5 m. In the day shift there will be a maximum of 25 employees at work. Other free parking spaces for cars are the car park "Object f". A total of 30 parking spaces will be available.

Sewage treatment plant (Object h)

A sewage treatment plant (WWTP) will also be located in the quarry area. The original wastewater treatment plant will be rehabilitated. The new wastewater treatment plant is designed for 350 PE. It is planned to be used both for the quarry facilities and for the workers of the treatment plant. It is proposed to use a standardized biological wastewater treatment plant of the AS-HSBR type, or similar.

Truck wash (washing the wheels of vehicles before leaving the quarry area (Object j)

The truck wash unit consists of two parts – washing pan, sludge pits. This washing unit is suitable for all mining mechanisms that will leave the quarry area. The sludge pit can be cleaned using an excavator shovel. The car wash is equipped with a device for capturing oil substances.

Mine water tank (Object m)

Two mine water tanks are located at the northern edge of object B1 – Raw material reservoir.

Reservoir of extracted raw material and pulping of raw material (B1)

The raw material reservoir, the pulping unit and the return station of the belt from the processing part of the plant for material intended for reclamation, including the reservoir of this material, will be placed in a hall with a ground plan size of approximately 108 x 42 m with a height of about 23 m. Receipt of material excavated in the quarry area is carried out through a hopper and a belt conveyor.

Conveyor for mining waste – technological bridge (B42)

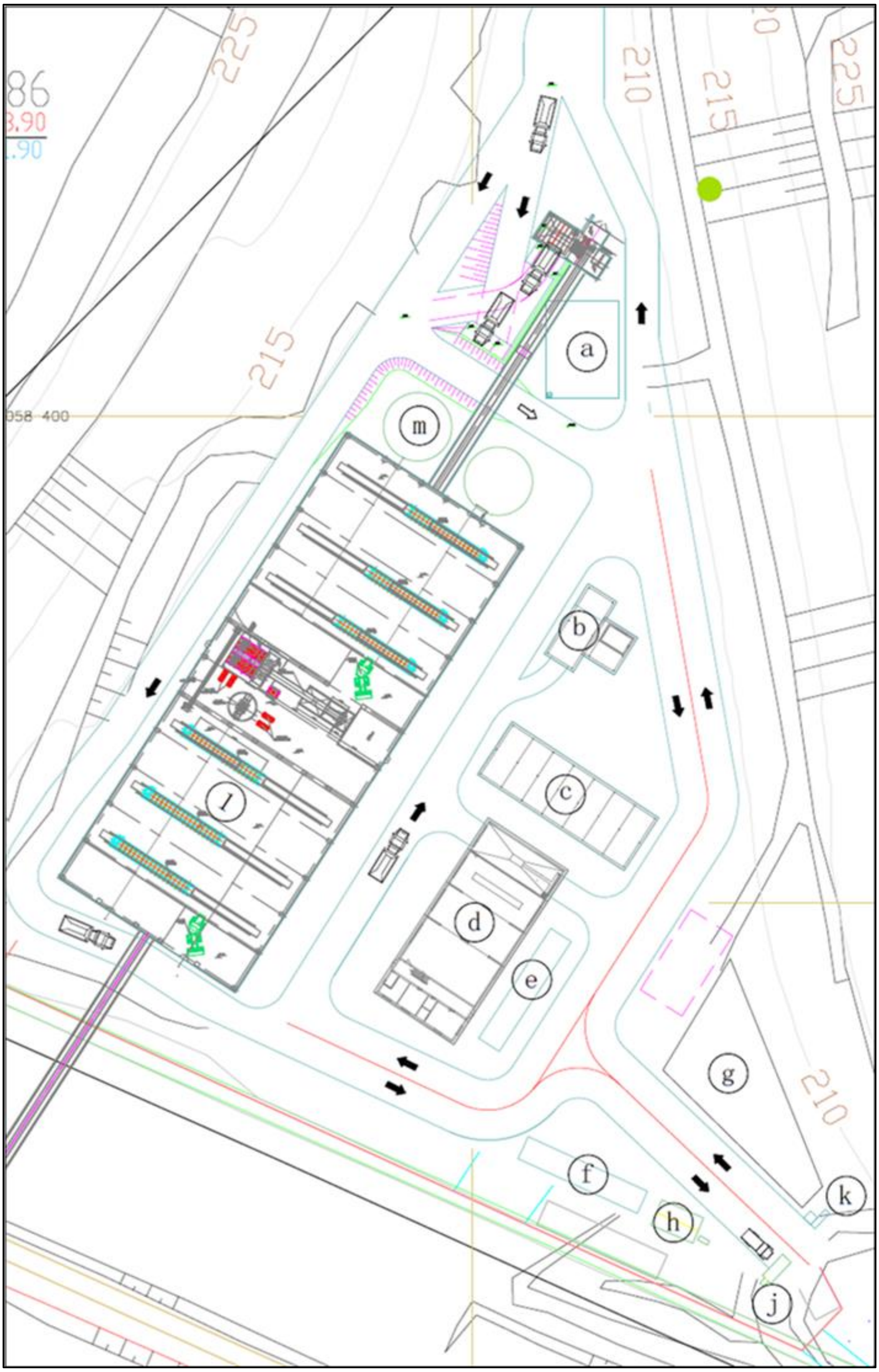
The technical data for conveyors are described in the chapter on the processing plant and in the table of the list of processing plant objects (Table No. 20).

Table No. 12: List and description of objects in the quarry background

Object designation	Building name Description of the building	Floor plan (m)	Height (m)	+/-0
01	**Raw material reservoir and resource pulping** Industrial building, 2nd floor Reception and storage of extracted raw material from the area of tailings. Separation of coarse impurities (roots, stones, etc.) through sieves. Washing of raw material in recycled process water. Temporary storage of recovered material (mining waste, NMT and LR). 	108 x 42	23	205
a	**Settling tank for mine water** Open settling tank for accumulation of mine water. The capacity of the tank is 3500 m3.	20 x 15		
b	**Diesel filling station**	17 x 12	6,3	

	Double-walled outdoor above-ground tank, 20 000 l with dispenser. The tank is located in a leak-proof area.			
c	**Parking lot of mining machinery**	36 x 13		
d	**Administrative building / Workshop** Industrial building, 2nd floor Social and administrative facilities of the quarry, which include offices, dressing rooms, sanitary and technical rooms.	42,1 x 18,6	8,7	
e	**Car parking (A)** Parking space for 20 cars for employees and visitors.	27 x 5		
f	**Car parking (B)** Parking space for 10 cars for employees and visitors.	27 x 5		
g	**Temporary material storage**	40 x 26.5		
h	**Sewage treatment plant** Standardized, mechanical-biological wastewater treatment plant, capacity max. 350 PE. After cleaning, the water will be drained into the Elbe.	2,5 x 3	4	
j	**Washing line for mining mechanization**	7,5 x 2,4		
k	**Gatehouse**	4.3 x 3.2	2,5	
m	**Mine water tank** 2 tanks, volume 2 100 m3 each			

Picture no. 36: Scheme of the location of buildings in the quarry background



Method of operation in the background

The raw material in the provision facility will be taken by a front loader and dosed into a hopper, from which it will be transported by screw conveyors to two drum sieves, which are used to separate coarse impurities such as roots, stones and foreign materials.

Due to the physical properties of the raw material, wet sieving using recycled process water will be used.

The sieved raw material will be mixed in the pulping tanks with recycled process water to form a slurry. The resulting slurry will be pumped through a pipeline located in a technological bridge (B42) leading across the railway corridor and the Chvaletice-Přelouč road to the storage tank located in the processing part of the plant. The transport of raw material in the form of slurry through the pipeline is chosen in order to minimize the operation of mobile equipment between the northern and southern areas of the project.

Mining waste transported in a technological bridge to the raw material storage facility building by a conveyor will be loaded by a wheel loader onto empty dumpers.

Time pools and shifts in mining

The number of working days in the quarry will be 250 days per year. Mining work during public holidays (weekends, holidays) will be possible only in special cases, such as filling the capacity of the raw material storage facilities. Tanks of mined raw material have a planning capacity of 3 days. Due to unfavorable weather for mining in connection with weekends or holidays, in exceptional cases the storage tank may be critically emptied and thus the production may be endangered.

The working day is divided into two working shifts. One shift has 8 working hours. The actual time of mining is 7 hours, one hour is the time designated for taking over the workplace and basic maintenance of mining mechanisms (refueling, lubrication and checking the technical condition).

Working hours in the morning shift are 6:00 - 14:00 and in the afternoon shift 14:00 - 22:00.

Table No. 13: Working time fund - mining part

Number of shifts	2	shifts / day
Shift length	8	hours
Number of working days in a year	250	days / year
Number of working hours in a year	4000	hours / year

The number of employees is shown in the following table.

Table No. 14: Number of employees - mining part

Position	shift 1 (number of employees)	Shift 2 (number of employees)
THP	2	1
Manual worker	21	17
Total	***23***	***18***

Construction of quarry facilities

As part of the construction of the quarry facilities, the following operations will be carried out:

1. *Fieldwork in the area of quarry facilities and pulping station*

In the area of mining/mining waste repository (in the triangle on the south side of the valley between the current heaps 1 and 2), a pulping station (combined with a reservoir of raw material and mining waste) and quarry facilities (administrative building, workshop, truck wash and pumping station) will be built. A new WWTP will be built on the edge of this area, replacing the original WWTP in the same area.

The area is mostly covered with material from the tailings and almost without vegetation. Only a small part of the area (around the existing WWTP) is covered with vegetation and contains a thin layer of fertile soil; This will be removed and moved to the inter-deposit of material for reclamation.

Progress of work:

- Hiding a fertile layer of soil in the area around the WWTP. Part of the overburden will result from the uprooting after deforestation.
- Rooting in the rest of the area that is not covered with fertilizable soil.
  Note: the uprooted woody mass (relatively small amount) will be temporarily stored near the affected area and subsequently chipped together with the wood mass obtained during the deforestation of the first part of the tailings.

The technique used is shown in the following table.

Table No. 15: Technique used for fieldwork in the area of the pulping station and quarry background

Název stroje	Počet strojů	Doba použití	Denní využití	Pozn.
		týdny	h/den	
Buldozer s ripperem	1	1	8	
Horizontální nakladač	1	2	8	
Nákladní automobil	1	2	8	

2. *Construction of a pulping station and quarry facilities*

Although the pulping station is located in the mining area, it technologically belongs to the processing plant. Also, the construction of this building will be identical to the buildings in the processing part of the plant.

In the vicinity of the pulping station, a hopper for extracted raw materials, quarry facilities (administrative building, workshop, mobile equipment wash, pumping station for quarry technology) and a wastewater treatment plant for both parts of the Manganese Chvaletice complex will also be built.

Work on the construction of the pulping station and the quarry facilities of the plant can be divided into 3 main phases:

- Phase A: construction of foundations and rough construction of the pulping station and its accessories, shell construction of quarry facilities
- Phase B: installation of building envelopes and roofs, final construction work
- Phase C: installation of internal networks and wiring, installation and wiring technological equipment, final outdoor work

Note:

- *Due to the extent of the work and the size of the construction site, the individual phases will partially overlap (= phase B will already be in one part of the construction site, while phase A will take place in another part).*
- *Road construction will also be carried out in phases so that synergies between the processing plant and mining areas can be exploited.*

Progress of work:

Phase A:

- Excavation work for the foundation of buildings, piling (if used)
- Construction of building foundations
- Construction of the load-bearing part of buildings
- Installation/construction of the load-bearing skeleton of the building and the supporting structure of the roof

Phase B:

- Lining of the skeleton, installation of roofs, installation of windows and doors, interior and exterior final construction work
- Laying of utility networks
- Installation of wiring in buildings
- Finishing touches on buildings
- Construction of a technological bridge between the processing and mining parts of the site

Phase C:

- Installation and interconnection of technological equipment
- Connection of technological equipment to networks
- Installation and interconnection of the control and security system
- Final exterior adjustments (terrain, roads, sidewalks, lighting, greenery)

The list of techniques used for the construction of the pulping station and quarry facilities in the individual phases is given in the following tables.

Table No. 16: Technique used for the construction of the pulping hall and quarry background - Phase A

Název stroje	Počet strojů	Doba použití	Denní využití	Pozn.
		týdny	h/den	
Hydraulický bagr	1	20	10	
Buldozer	1	10	10	
Horizontální nakladač	1	32	10	
Nákladní automobil - vnitroareálová přeprava	1	32	10	
Nákladní automobil	2	25	12	doprava materiálu
Domíchávač betonu	2	10	10	
Vrtná souprava	1	4	12	počáteční fáze
Mobilní jeřáb	1	10	8	
Věžový jeřáb	1	20	12	
Mobilní plošina	2	24	12	
Systém na čerpání betonu	1	10	10	periodicky
Drobná mechanizace a ruční nářadí	xx	32	periodicky	

Table No. 17: Technique used for the construction of the pulping station and quarry facilities - Phase B

Název stroje	Počet strojů	Doba použití	Denní využití	Pozn.
		týdny	h/den	
Hydraulický bagr lehký	1	10	8	
Horizontální nakladač	1	28	10	
Nákladní automobil - vnitroareálová přeprava	1	28	10	
Nákladní automobil	5	28	12	doprava materiálu
Domíchávač betonu	1	4	10	
Mobilní jeřáb	1	20	8	
Mobilní plošina venkovní	2	28	12	
Mobilní plošina venkovní	1	28	12	
Drobná mechanizace a ruční nářadí	xx	28	periodicky	

Table No. 18: Technique used for the construction of the pulping station and quarry background - Phase C

Název stroje	Počet strojů	Doba použití	Denní využití	Pozn.
		týdny	h/den	
Vibrační válec	1	4	8	
Horizontální nakladač	1	20	10	
Nákladní automobil - vnitroareálová přeprava	1	14	10	
Nákladní automobil	2	14	12	doprava materiálu
Grader	1	2	12	
Finišer	1	2	12	
Válec	1	2	12	
Drobná mechanizace a ruční nářadí	xx	24	periodicky	

Notes:

- *The usage time indicates the maximum operating time of the machine for the implementation of the entire project (including non-working days due to climatic and technological reasons). In case of favorable circumstances, the work may be completed earlier.*
- *Daily usage means the maximum number of working hours per day (not working hours at the workplace).*
- *These machines and equipment will be used as needed. The concurrence of operation of all devices can be considered the worst case, however, this is a condition that will occur rather rarely.*

3. *Construction of an access road to the mining area and the first part of the mining waste repository*

Extraction of the raw material will begin on the eastern side of heap No. 3. The first part of the mining waste repository will be built in the vicinity of the area where mining will start (to the east).

To ensure easy transport of the excavated material to the pulping station and the mining waste back to the mining waste repository area, a road will be built between heaps No. 1 and No. 2 and the first part of the mining waste repository will be prepared.

Progress of work:

Road construction:
- Overburden surface layers of material next to an existing path (expands)
- Recycled material and gravel fill, surface levelling and compaction

Mining waste repository:
- Overburden of the surface layer of soil and its transfer to the inter-depot (in the future it will be used for reclamation)
- Landscaping to achieve the correct altitude and slope of the bottom of the future repository (excavation/embankment)
- Installation of insulation foil
- Installation of the drainage system and its backfilling with aggregate
- Creation of temporary mine water retention reservoirs from the mining and storage area and their connection with the mine water reservoir at the pulping hall

The following table lists the techniques used to build the access road to the mining area and the first part of the mining waste repository.

Table No. 19: Technology used in the construction of the access road to the mining area and the first part of the mining waste repository

Název stroje	Počet strojů	Doba použití	Denní využití	Pozn.
		týdny	h/den	
Hydraulický bagr	1	4	8	
Horizontální nakladač	1	20	8	
Nákladní automobil - vnitroareálová přeprava	2	20	8	
Nákladní automobil	2	10	8	doprava materiálů
Grader	1	3	12	
Vibrační válec	1	3	12	
Drobná mechanizace a ruční nářadí	xx	24	periodicky	

<u>*Notes:*</u>
- *The usage time indicates the maximum operating time of the machine for the implementation of the entire project (including non-working days due to climatic and technological reasons). In case of favorable circumstances, the work may be completed earlier.*
- *Daily usage means the maximum number of working hours per day (not working hours at the workplace).*
- *These machines and equipment will be used as needed. The concurrence of operation of all devices can be considered the worst case, however, this is a condition that will occur rather rarely.*

d) Processing plant

The design of the processing plant is based on the Feasibility Study and project documentation (Process Plant Basic Design, BGRIMM, 2022)(Johns, a další, 2022)

<u>Basic description of the processing plant premises</u>

In the processing plant, the input material (pulped raw material) will be subjected to magnetic separation, acid leaching, purification, and Mn electrowinning. The output product will be high-purity electrolytic manganese metal and manganese sulphate monohydrate. The production capacity will be 50,000 t/year of pure metallic manganese, about two-thirds of this production will be further reprocessed to 100,000 t/year manganese sulphate monohydrate. Thus, 17,000 t/year of pure metallic manganese and the above-mentioned amount of manganese sulphate monohydrate produced will be dispatched.

The processing plant is designed for the built-up area of the Chvaletice industrial zone, where a number of partially used buildings are located. As part of the preparation of the area, it will be necessary to demolish most of the existing buildings, because they are from the construction and from a process point of view unsuitable for the location of the new processing plant technology. The buildings to be removed are mostly unused production halls and warehouses. The method of carrying out demolition work and the inventory of the waste generated in terms of its quantity and type is the subject of a separate study , which also included a construction-technical survey with regard to the occurrence of asbestos .(Šarman, 2022)(Balvín, 2021)

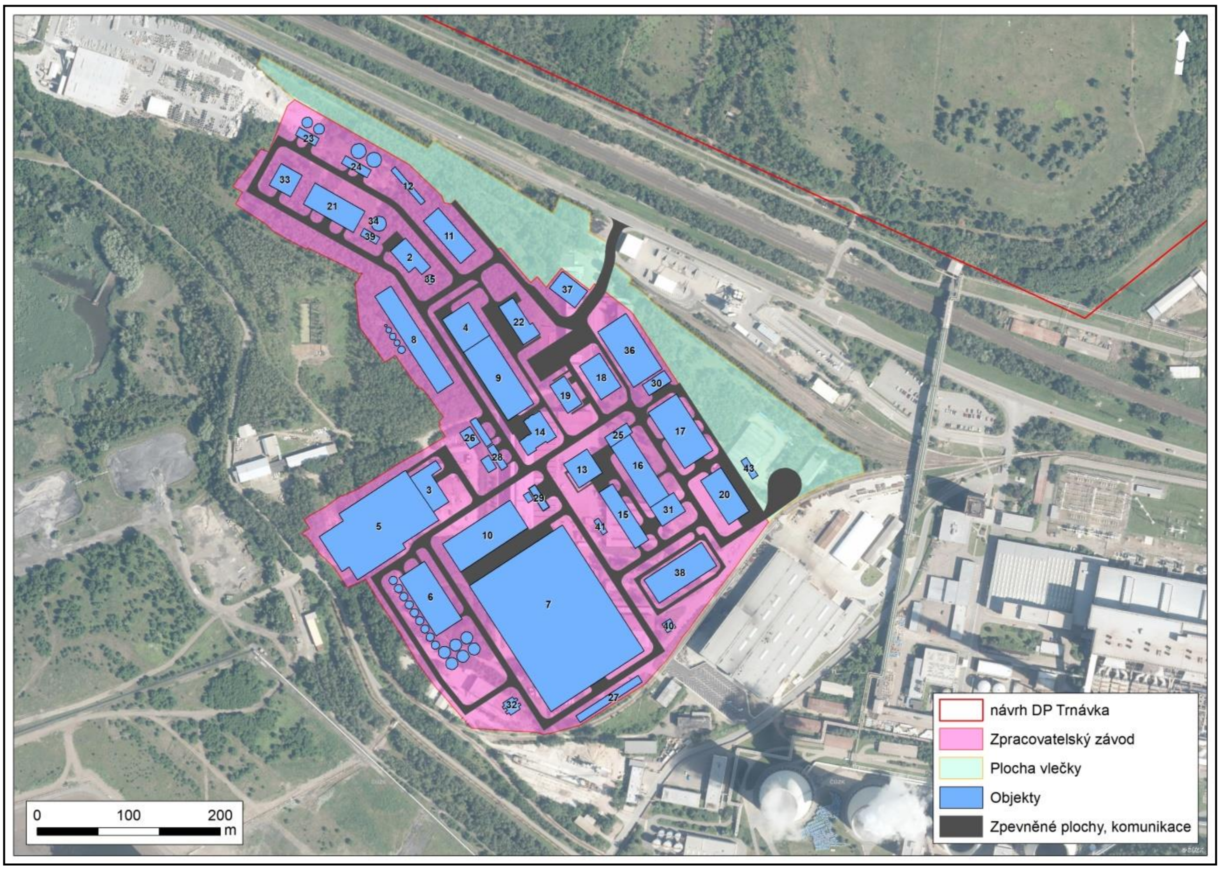
Due to the configuration of the terrain, where about half of the land area is not flat, it will be necessary to create a system of terrace platforms in the southern and southwestern parts of the plant site for the placement of new objects. In this part of the plot is supposed to create three height levels of terraces of rough landscaping.

A new siding will lead to the northeastern part of the plot, which will be used for supplying input raw materials and shipping products. The processing plant will consist of a number of medium-sized structures, a reinforced concrete structure is envisaged. Industrial buildings will be structurally designed with heavy construction, others as light structures. The new processing plant will also include an administrative building.

The list of buildings (SO), including the ground plan dimensions and heights of individual objects, is given in detail in the table, which forms the following subchapter. Modern production technology, which will be placed in construction objects, will include a number of process steps, which are described in detail below.

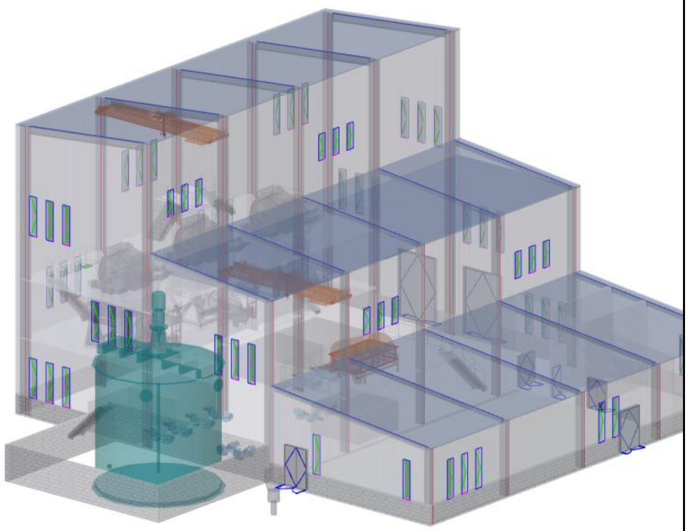
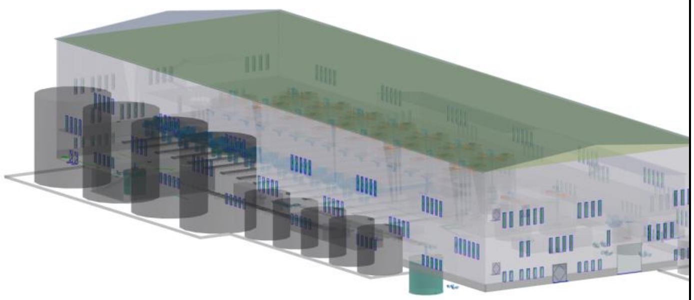
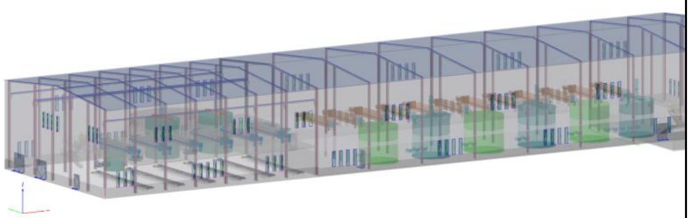
The following picture shows the schematic layout of individual buildings in the area. The object numbers correspond to their numbering in the following table. In the Annex in Part H, the situation of the plant site is in a more detailed resolution.

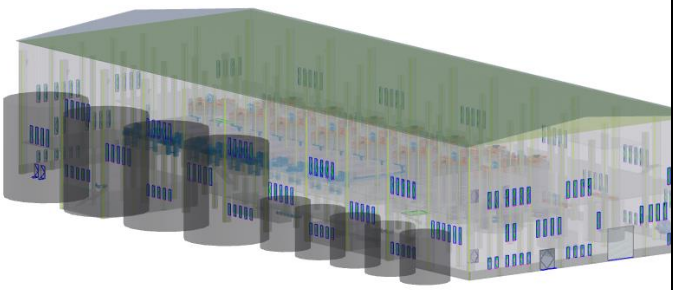
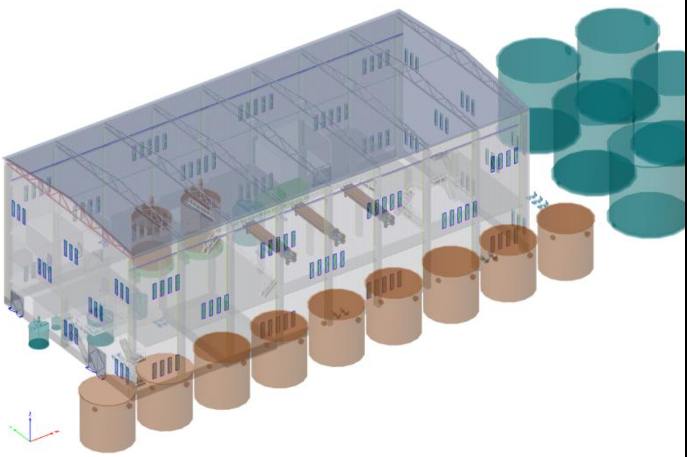
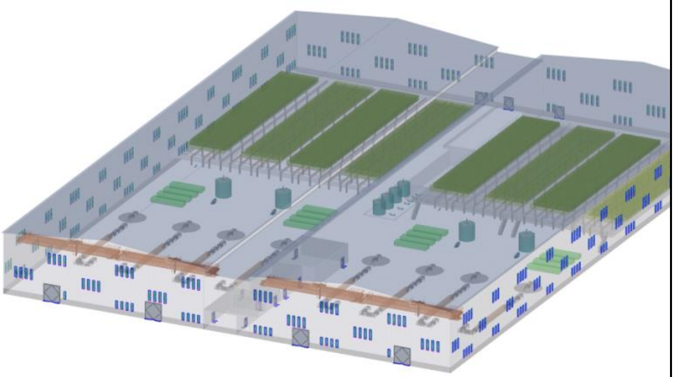
Picture no. 37: Location and description of objects in the project area

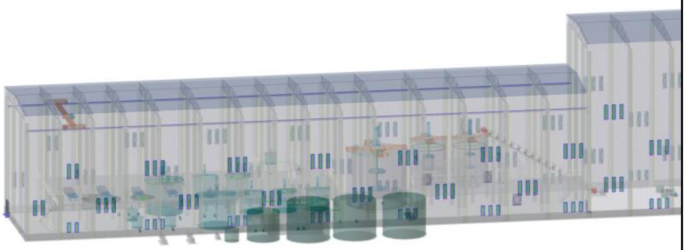
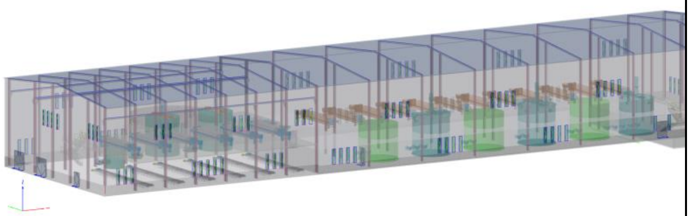
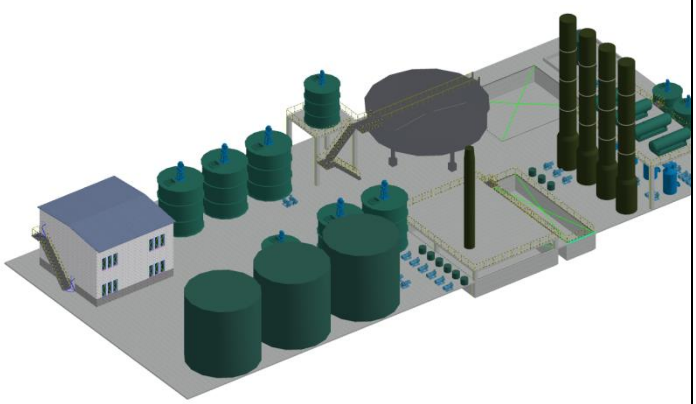

návrh DP Trnávka
Zpracovatelský závod
Plocha vlečky
Objekty
Zpevněné plochy, komunikace
0
100
200
m

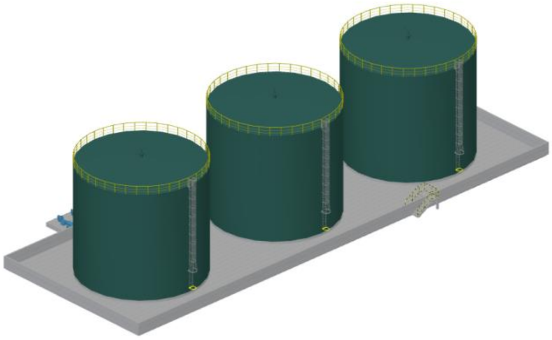
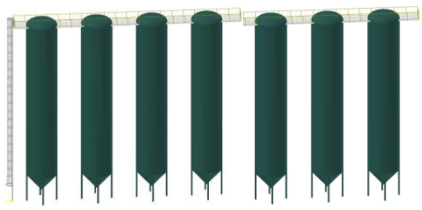
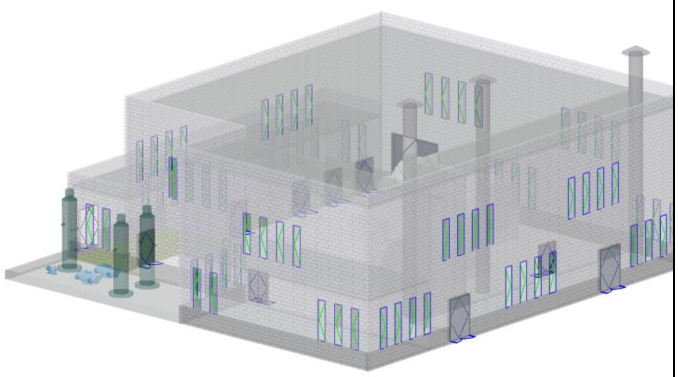
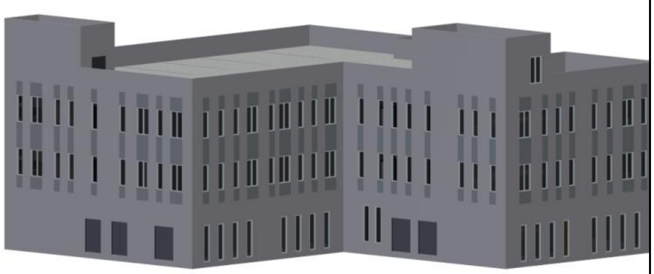
List of structures

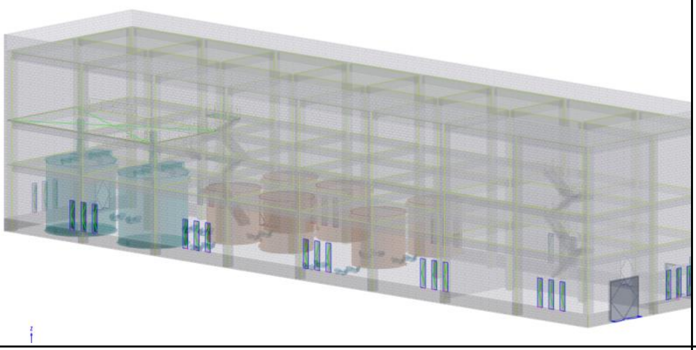
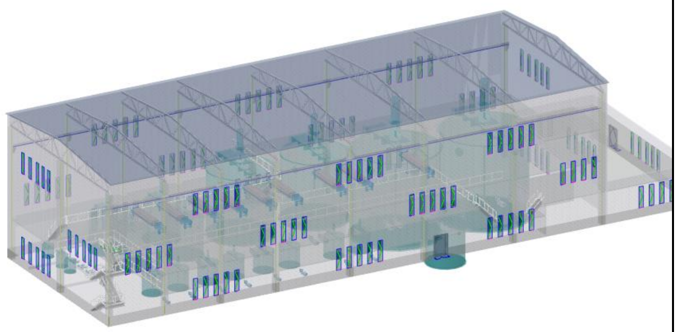
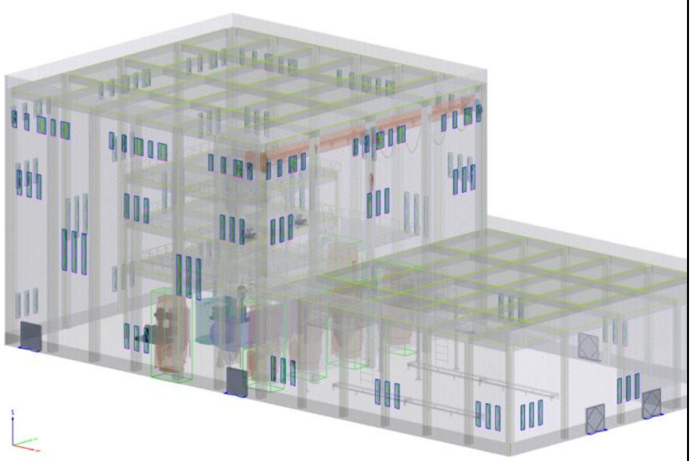
Table No. 20: List and description of structures in the processing plant area

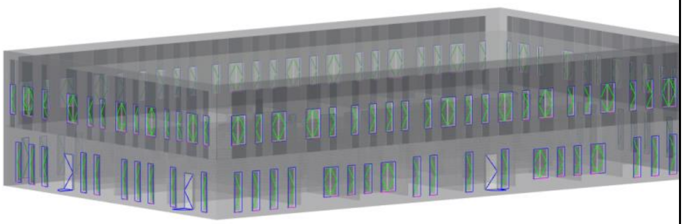
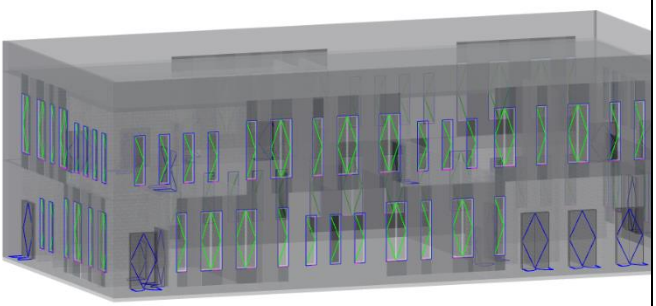
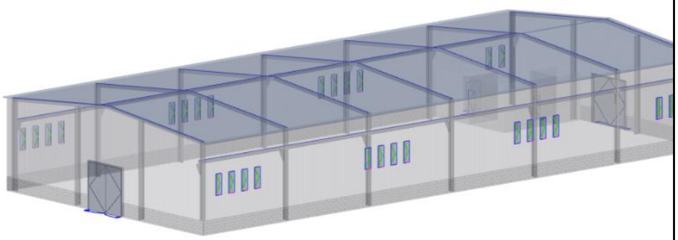
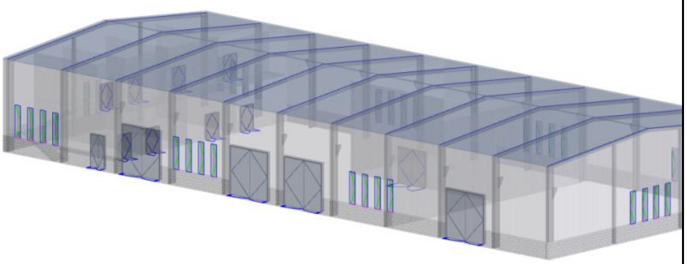
Property number	Object name Object description	Floor plan(m)	Building height (m)	+/-0 (m asl)
02	**Magnetic separation** Industrial building, 3rd floor Extension 13x11m. Processing of raw material by two-stage magnetic separation under the action of an intense magnetic field. 	30x34	19 The highest part of the building	221
03	**Concentrate storage and pulping** Industrial building, 3rd floor Dewatering of concentrate on pressure filters. 	21x45	18,6	220,5
04	**Magnetic separation tailing (NMT) dewatering** Industrial building, 2nd floor Dewatering of NMT on pressure filters. 	42 x 33	15	217

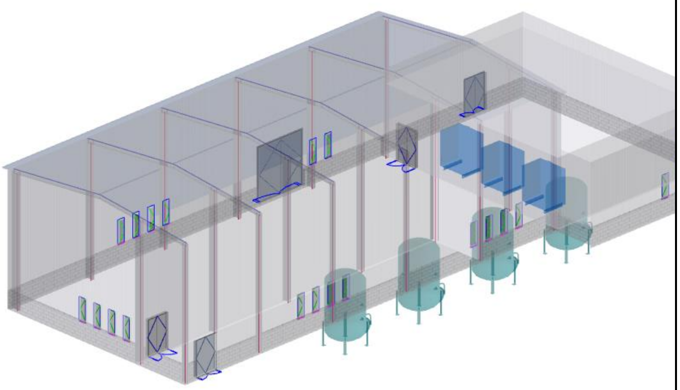
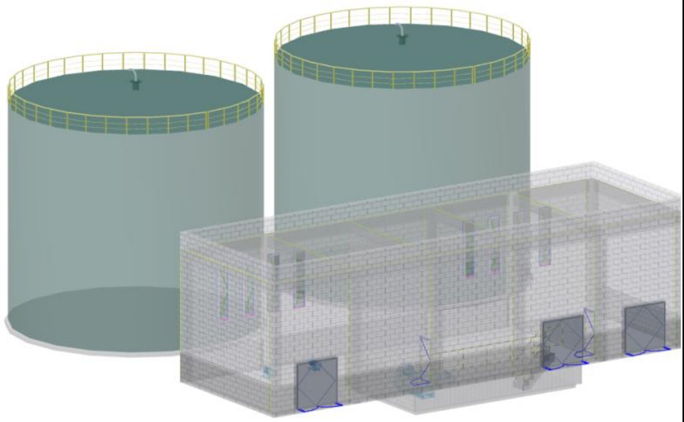
Property number	Object name Object description	Floor plan(m)	Building height (m)	+/-0 (m asl)
05	**Leaching and Fe removal** Industrial building, 2nd floor Dissolution of manganese-containing minerals by means of sulphuric acid at 80 to 90 ^{o}C in closed mixing tanks. Precipitation of undesirable elements (calcium, magnesium, phosphorus, iron) by adding lime. 	115,5 x 45	28,3	222
06	**Pregnant solution purification (Preparation of solution for electrowinnig)** Industrial building, 2nd floor Removal of trace amounts of metals (zinc, copper, cobalt, nickel, lead) by chelation and sulphide precipitation. 	72 x 33	25,5	220
07	**Electrowinning** Industrial building, 2nd floor Electrowinning of electrolytic manganese metal from manganese sulphate solution. 	162,1 x 120	14	217

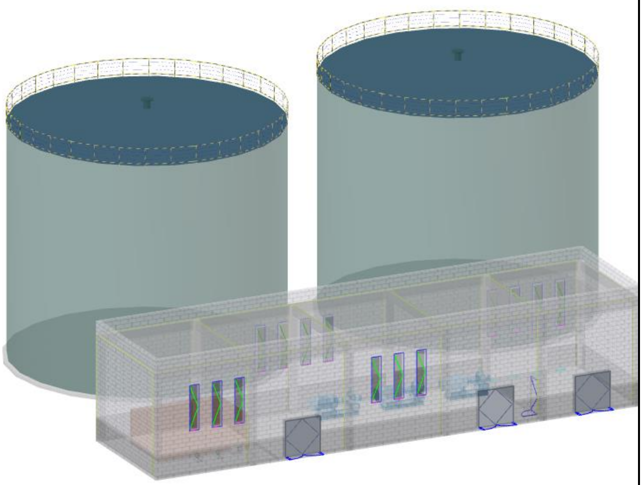
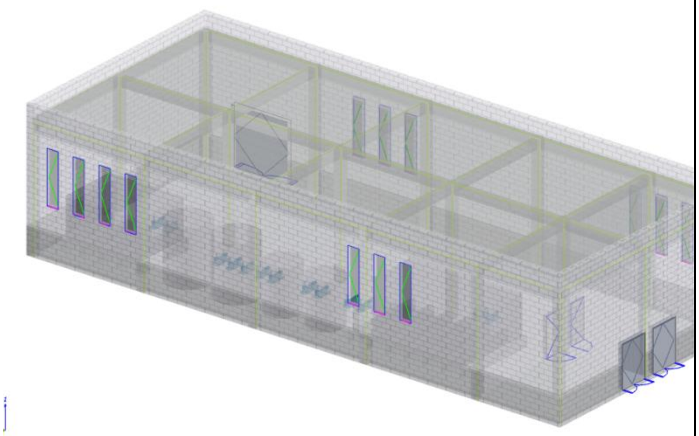
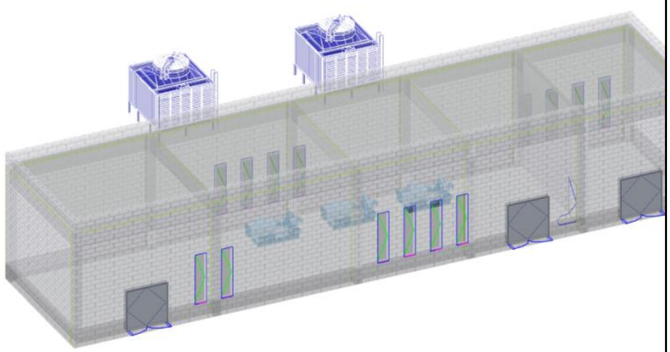
Property number	Object name Object description	Floor plan(m)	Building height (m)	+/-0 (m asl)
08	**Mg removal** Industrial building, 2nd floor Removal of magnesium by the triple salt method (manganese-magnesium-ammonium sulphate). 	144 x 21	30.7 highest part	220,5
09	**Leach Residue Dewatering** Industrial building, 2nd floor Flushing of the leaching from the iron/phosphorus removal circuit using process water and its washing and subsequent dewatering on pressure filters. 	88,5 x 33	15	217
10	**Ammonia recovery** Industrial building, 1st floor Release of ammonia from the filtrate after the addition of slaked lime by means of steam. 	12x12	8,5	217
11	**Sulphuric acid storage tanks** 3 single-walled tanks, each with a volume of 1150 m3 placed in a collection tank.	3x 1150 m3	6,5	218

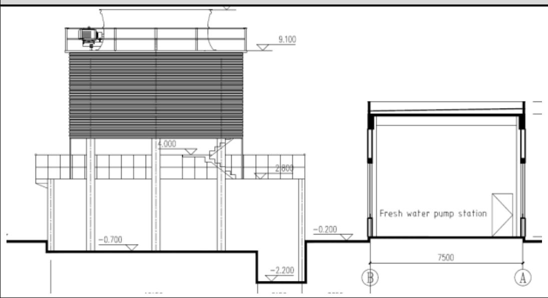
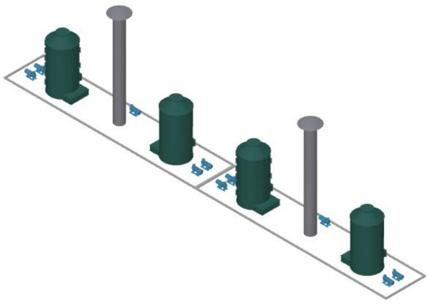
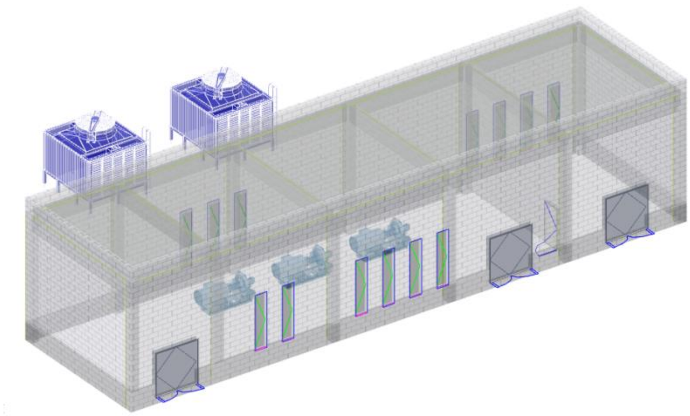
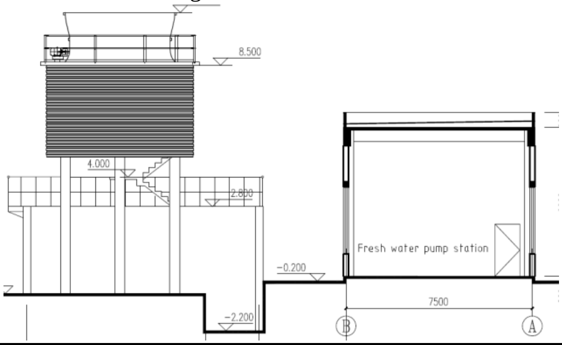
Property number	Object name Object description	Floor plan(m)	Building height (m)	+/-0 (m asl)
				
12	**Lime Oxide Silos** 7 steel silos, each with a capacity of 318 m3 	7x 318 m3	20	218
13	**Hydrogen Gas Reuse System** Industrial building, 1st floor Purification of produced hydrogen gas and its subsequent combustion together with natural gas using heat to produce steam for the process. 	30 x 30	10,5	214
14	**Technical and administrative building** Light building, 3rd floor Administrative activities, production management 	31,5 x 35	13,5	217

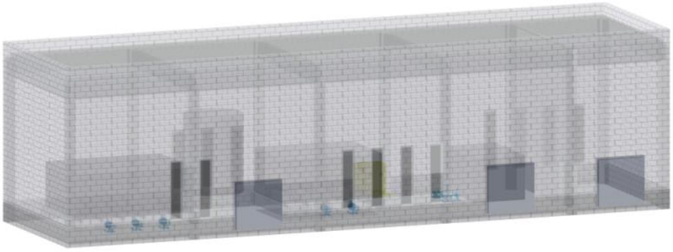
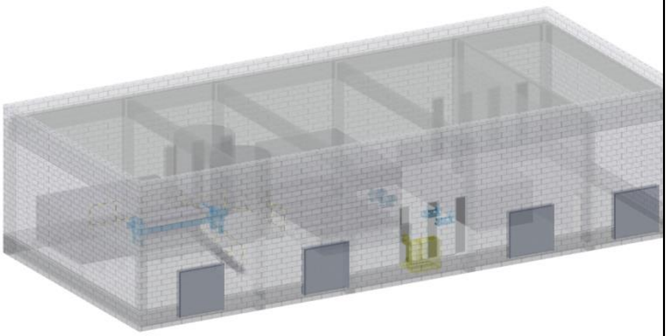
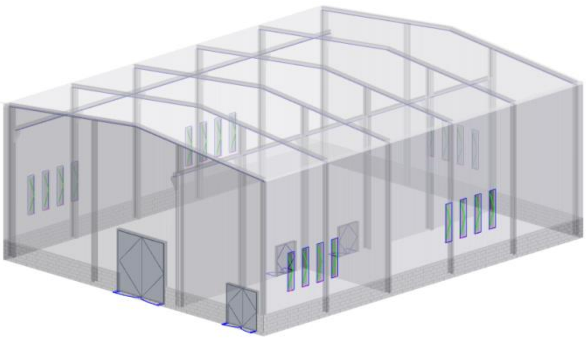
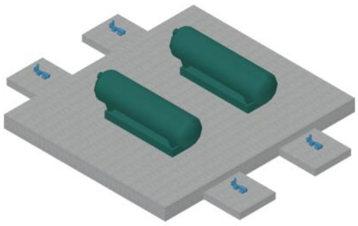
Property number	Object name Object description	Floor plan(m)	Building height (m)	+/-0 (m asl)
15	**Dissolution of manganese metal** Industrial building Dissolving the manganese metal produced from the electrowinnig process with sulfuric acid. 	72 x 16,5	16,5	214
16	**Manganese sulphate purification** Industrial building, 4th floor Removal of zinc and similar metals from manganese sulphate solution by sulphide and removal of iron by oxidation of ferrous ions by oxidation. 	79 x 24	16,5	214
17	**HPMSM Evaporation / Crystallization / Drying / Packaging** Industrial building, 1st floor Concentration of manganese sulphate solution in evaporator, crystallization, drying in disc dryers, storage and packaging of the product. 	72 x 36	29.5 highest part	213,5

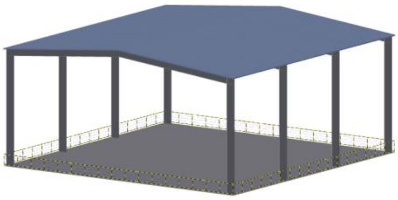
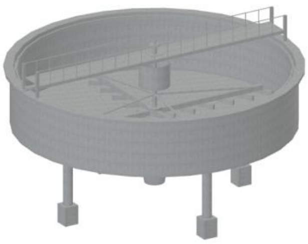
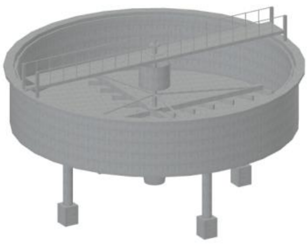
Property number	Object name Object description	Floor plan(m)	Building height (m)	+/-0 (m asl)
18	**Administrative building** Administrative building, 2nd floor Administration, offices 	41,7 x 24,3	9	213,5
19	**Cloakrooms and dining room** Administrative building, 2nd floor Facilities for employees, catering facilities 	34 x 17	11	214
20	**Product warehouse** Light construction, 1st floor Storage of products in 1-ton big-bags or bags stored on pallets. 	54 x 24	7,5	231,5
21	**Maintenance workshop and spare parts warehouse** Light construction, 1st floor Maintenance facilities, workshop, spare parts warehouses 	60 x 24	7,5	219,5

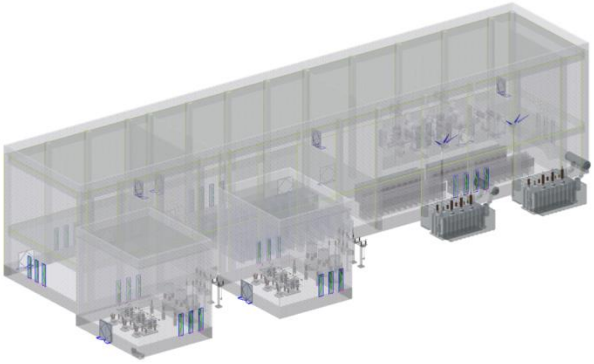
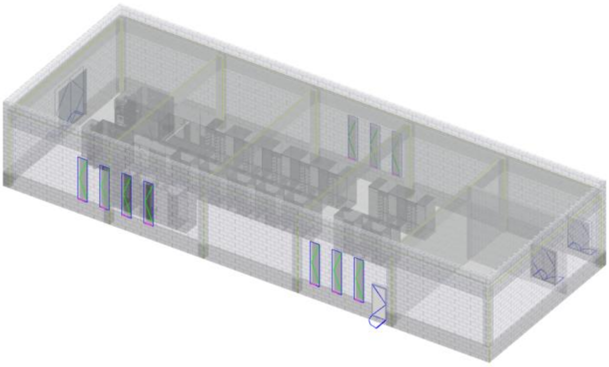
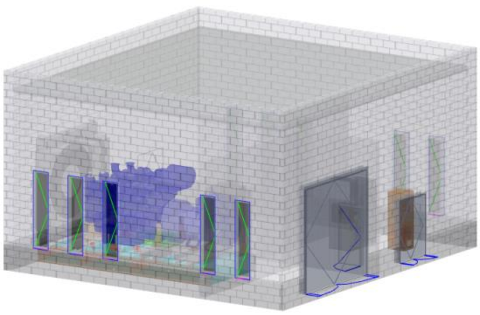
Property number	Object name Object description	Floor plan(m)	Building height (m)	+/-0 (m asl)
22	**Compressor station** Industrial building, 2nd floor Compressed air production 	47,5 x 20	10	217
23	**Pumping station for service and fire water** Industrial building, 1st floor Pumping station for a separate circuit of service and fire water. 	22,5 x 7,5	6	223,5
24	**Industrial water treatment plant and pumping station** Industrial building, 1st floor Physico-chemical treatment plant for maintaining the quality of the internal water circuit.	30 x 7,5	9	222,5

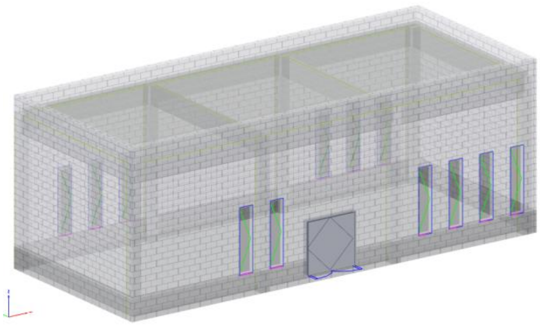
Property number	Object name Object description	Floor plan(m)	Building height (m)	+/-0 (m asl)
				
25	**Pure Water Preparation Workshop** Industrial building, 1st floor Treatment plant for maintaining the required quality of circulation water. 	28,5 x 12	6	
26	**Cooling circuit of the production process** Industrial building, 1st floor Removal of waste heat from the production process with the exception of electrowinnig  Detail of the cooling unit	33 x 7,5	6	219

Property number	Object name Object description	Floor plan(m)	Building height (m)	+/-0 (m asl)
				
27	**Electrowinnig exhaust gas scrubbing system** Industrial building, 1st floor Waste gas scrubbing 	24 x 7,5	5,3	220
28	**Electrowinning workshop cooling circuit** Industrial building, 1st floor Removal of waste heat from the electrowinnig process.  Detail of the cooling unit 	28,5 x 7,5	6	219

Property number	Object name Object description	Floor plan(m)	Building height (m)	+/-0 (m asl)
29	**Industrial wastewater treatment plant** Industrial building, 1st floor Wastewater treatment before discharge into a watercourse 	28,5 x 7,5	7	217
30	**Rainwater treatment plant** Industrial building, 1st floor Treatment of (physical) rainwater 	27 x 12	6	
31	**Heat exchange station** Industrial building, 1st floor Hot water exchanger high pressure heating water / low pressure heating water 	30 x 24	10,5	
32	**Ammonium Hydrogen Sulfite Tanks** 2 steel tanks 38.5m3 each. The tanks will be placed in a sump basin. 	2x 38,5m3	2	
33	**Spare parts warehouse**	24x24	9	219,5

Property number	Object name Object description	Floor plan(m)	Building height (m)	+/-0 (m asl)
	Light construction, 1st floor Fund 			
34	**Tailings Thickener** Thickening of the suspension of the non-magnetic fraction 			
35	**Concentrate Thickener** Thickening of the suspension of the non-magnetic fraction 			
36	**Contact water pond** Tank capacity 10 660 m3 Reservoir for the accumulation of rainwater from roads and handling areas in the area of the processing plant. The waters will be used as a source of industrial water.	72x37		
37	**Storm water pond** Tank capacity 3220 m3 Tank for the accumulation of clean rainwater in the area of the processing plant.	35x23		
38	**Main substation** 400/35/10kV Industrial building, 2nd floor	71,5 x 24	15	214

Property number	Object name Object description	Floor plan(m)	Building height (m)	+/-0 (m asl)
				
39	**Substation** Industrial building, 1st floor 10kV / 400V 	24 x 10,5	4	
40	**Backup power supply** Industrial building, 1st floor Double-jacket tank 2000l located in building B40 directly connected to the generator. 	11.7x11.2	7	
41	**Nitrogen production unit** Industrial building, 1st floor Nitrogen production	18x6	6	

Property number	Object name Object description	Floor plan(m)	Building height (m)	+/-0 (m asl)
				
42	**Technology bridge** A closed building leading through the railway corridor and the Chvaletice-Přelouč road, in which a belt conveyor will be placed.	Profile 3x2,5		
43	**Workshop and administrative background of the siding** Industrial building, 2nd floor Workshop and administrative activities Next to the building there is a double-walled outdoor tank 20000l with a dispenser for the locomotive and a dispenser for small mobile mechanization of the processing plant.	23x8	11	
Facility 515	**Existing building – 515**	35 x 16	11	218
Facility 517	**Existing building – 517**	28 x 13	9	215

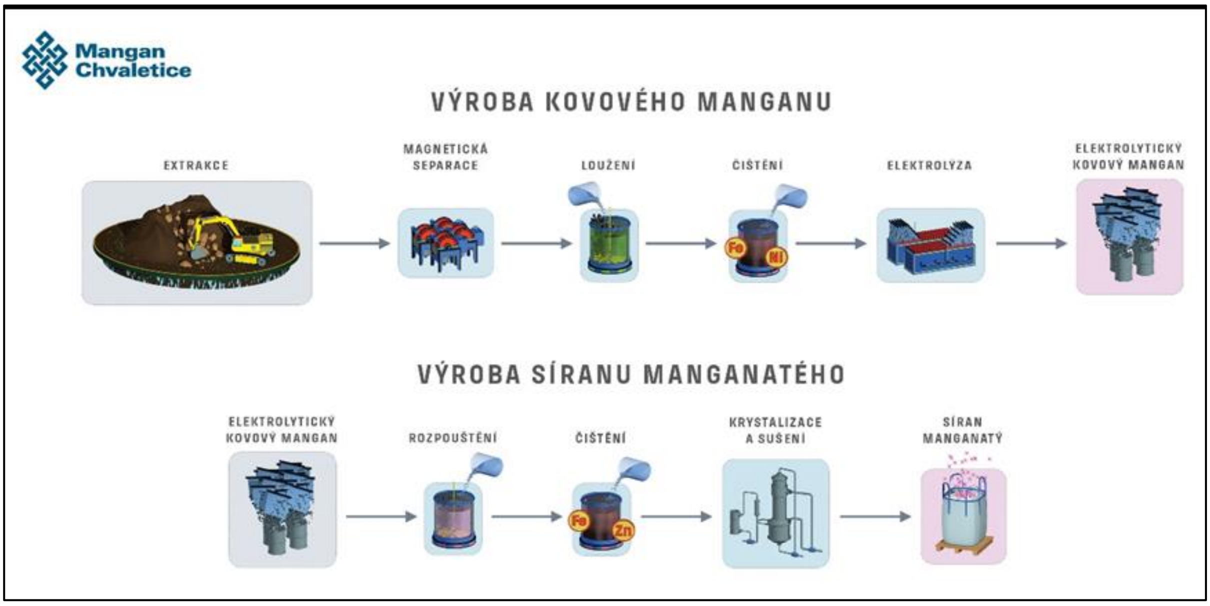
<u>Technological process of production of electrolytic manganese metal (EMM) and manganese sulphate monohydrate (MSM)</u>

The processing of raw material extracted from former tailings is a complex process that will use a number of physical, chemical and electrochemical processes. When designing the production process, great emphasis is placed on environmental protection and worker safety. For this reason, selenium, chromium and fluorine compounds will not be used in the manufacturing process.

The production process consists of two stages. In the initial stage, EMM will be produced with a purity exceeding 99.9%. Subsequently, in the second stage, a portion of the produced manganese metal will undergo reprocessing to yield MSM with a purity surpassing 99.9%.

The process of manganese production is graphically shown in the Picture no. 38 and the individual steps of the process, including assignment to the corresponding buildings, are described below.

Picture no. 38 Diagram of the production process



Storage and pulping of raw material

The extracted raw material will be transported by trucks to the raw material storage facility (B01) located in the space between cells No. 1 and 2. The capacity of the storage facility will correspond to approximately three days' consumption of raw material in the processing plant.

The raw material in the storage room will be dosed by an automatic crane on a coarse sieve, where coarse impurities such as roots, stones or foreign materials will be separated.

The sieved raw material will be mixed with water in the pulping tank. This slurry will be pumped through a pipeline placed into a technological bridge (B42) leading across the railway corridor and the Chvaletice-Přelouč road to the processing part of the plant.

Manganese concentration - magnetic separation (B02, B03, B04 and B34)

The feed slurry will first be processed by two-stage magnetic separation (B02). The proposed magnetic separation circuit will consist of one stage of rougher separation followed by scavenger separation and scavenger cleaner separation. The magnetic separators will be connected with a flexible feed slurry by-passing system which will allow the rougher and scavenger separations to operate all the time if one of the separators requires unscheduled maintenance. The result of magnetic separation will be an enriched raw material with a manganese content of approximately 15 % (manganese content before separation is about 7.3 %) and a non-magnetic part with a minimum residual manganese content.

The magnetic concentrate and non-magnetic fraction will be dewatered separately (non-magnetic material – thickener B34 and its dewatering in pressure filters B04, concentrate – dewatering in pressure filters B03).

The dewatered concentrate will be further processed in the acid leaching process.

After dewatering (B04), the non-magnetic fraction (NMT) is mixed with the washed and dewatered residue from the acid leaching and iron removal process (LR, B05 process) and transported by a closed belt conveyor over the technological bridge (B42) to the area of temporary storage of NMT/LR material in the raw material storage facility (B01). From this point, the material will be removed by a horizontal loader and transported to the final storage area using trucks that import the extracted raw material.

Water from pressure filters used in dewatering the NMT will be pumped through a pipeline located in the technological bridge (B42) back to the pulping station in the area of the heaps (B01) and reused for the preparation of fresh feed slurry. Water from LR dewatering pressure filters will be returned to the industrial water circuit.

Leaching (B05)

The filtered magnetic concentrate cakes will be conveyed to the acid leach plant (B05). The acid leaching circuit is associated with the iron and phosphorus removal circuit. Manganese carbonate formed in the Mg removal circuit (B08) and in the manganese recovery circuit will also be dissolved in the leaching process. The result of the leaching process is a crude solution of manganese sulphate with impurities.

The dewatered magnetic concentrate will be mixed with spent anolyte generated from the manganese electrowinnig process (B07). *(An anolyte is a solution coming out of an electrolyzer. When passing through the electrolyzer, not all manganese is deposited, and part of the Mn content is returned to the process. Anolyte also contains free sulfuric acid and ammonium sulphate).* Anolyte to pre-leach the concentrate is used both to minimize waste production and manganese loss.

The anolyte used for leaching the concentrate will be preheated in two stages. In the first stage, preheating will be carried out by extracting residual hear from the leach residue prior to being filtered and in the second stage by superheated hot water (130 °C). Pulping will take place in building B03 located next to the building for leaching and removal of iron / phosphorus (B05). The re-pulped slurry will be pumped into a leaching circuit (B05), which consists of seven cylindrical mixing tanks measuring 8 x 8 m.

Sulfuric acid will be used to leach manganese-containing minerals. Leaching will take place at a temperature of about 80 to 90 °C in closed mixed tanks. Carbon dioxide gas (CO2) will be produced. The purified off-gas will be discharged into the air while part of the carbon dioxide gas from the off-gas will be directed to downstream circuits for magnesium removal and manganese recovery.

The CO2-containing leaching process gas will be cooled and washed with water before further use to remove trace amounts of acid and solid particles. The resulting condensate and used washing solution will be returned to the main water tank for the acid leaching circuit.

Removal of iron and phosphorus compounds (B05)

During acid leaching, iron, phosphorus, magnesium, calcium, heavy metal impurities (including copper, cobalt, nickel, lead, and zinc), and other impurities will also be partially leached out and enter the leach solution.The aim of this step of the process is the conversion of soluble iron and phosphorus compounds into insoluble substances and their removal together with the insoluble leaching residue (B05).

According to the test results, the goethite method is proposed to remove dissolved iron from the liquid phase by precipitation. The iron removal treatment will be conducted using lime to adjust the slurry pH to approximately 6.0 to 6.5. Air will also be introduced to the iron and phosphorous removal reactors to oxidize ferrous iron to ferric iron in order to facilitate precipitation.

Neutralization will take place at a temperature of approximately 90 °C in seven closed mixed cylindrical tanks with dimensions of 8 x 8 m located in object B05. Heating of the reaction mixture will be carried out indirectly using superheated water as a heating medium.

The neutralised slurry will pass through heat exchangers to utilise the residual heat. The cooled slurry will then be filtered through pressure filters to separate the solution from the solid residue. The solution, which consists mainly of manganese sulphate and magnesium sulphate, will be purified in the next step of the process (B06).

The filter cake from the leaching process is washed with process water and pumped into the leach residue dewatering facility (B09), where it is washed and subsequently dewatered. The washed and drained filter cake is mixed with the NMT and transported with it to a reservoir (B01) in the tailings area.

Removal of compounds, unwanted metals and other impurities (B06)

The filtrate from the leaching and Fe/P removal process will be further purified to remove trace amounts of metals such as zinc, copper, cobalt, nickel and lead (B06) present in small quantities in the filtrate. These metals will be removed by chelation and sulfide precipitation.

An organic sulfide-function chelating agent will be used to reduce the concentration of undesirable metals below target values, together with barium sulfide. Metal ions will react with sulfide ions (S2-) to form insoluble sulfides. The resulting slurry will be filtered to separate the sulphide precipitate from the solution. The removed solid precipitate represents one of the waste materials from the process, the removal of which from the premises of the Manganese Chvaletice plant and subsequent removal will be ensured by an authorized company.

For the production of ultra-high purity EMM, the solution described above will additionally be purified by adsorption of organic compounds using activated carbon. Filter the resulting suspension again to separate the activated carbon from the solution. The removal and subsequent removal of used activated carbon from the premises of the Mangan Chvaletice plant will be provided by an authorized company.

The filtrate from the previous step will be pumped into six cylindrical settling tanks of 13 x 13 m located outside the building for settling 36 hours. In these tanks, very fine particles are separated. The clear solution will be filtered using polishing filters. The filtrate from these filters will represent the final solution or so-called qualified solution for the subsequent electrowinnig process. The settled sludge will be periodically pumped back into the iron and phosphorus removal process.

Production of electrolytic manganese metal (B07)

Electrolytic manganese metal (EMM) will be obtained from manganese sulphate solution by electrochemical reduction (B07). In this process, selenium compounds, which are widely used in the industrial electrowinnig of manganese, will not be used as an agent to increase the efficiency of electrowinnig. For environmental and service reasons, an advanced method of electrowinnig is proposed for this project, where selenium compounds are replaced by ammonium bisulphite. An ammonium hydroxide solution and an ammonium sulphate solution will be added to the electrolysed solution to adjust the pH to increase the conductivity of the solution (target concentration of ammonium sulphate is approximately 110 to 130 g/l).

During the electrowinning process, manganese will be deposited on stainless steel or titanium cathodes (a decision will be made at the next stage of project preparation). Electrowinning will take place in four electrowinning lines, each containing 80 segments of three cells, for a total of 240 cells per line.

Manganese deposited cathodes will be removed from the cells and replaced by purified cathodes. Cathode replacement will be carried out by an automated mechanical system.

Cathodes after removal from the cell will be washed with hot water and dried. For environmental reasons, passivation of metal manganese, a hexavalent chromium compound commonly used in the electrolytic extraction of manganese, will not be carried out.

The washed and dried cathodes will be transported to one of eight stripping machines, where the manganese metal will be mechanically peeled off the cathodes. The cathode plates will be further treated by cleaning, polishing, and conditioning by sodium silicate ((SiO2(Na2O)x) before they are re-used in the electrowinning circuits.

The stripping machine will be equipped with a dedusting system for capturing fine manganese particles. The collected dust will be used in the deep-purification process of the MSM preparation. The dedusted air will be discharged into the atmosphere.

Manganese metal flakes stripped from the cathode plates are expected to contain manganese of an overall purity greater than 99,9 %, a thickness of approximately 0,5 to 0,7 mm and a size of up to 20 × 20 mm. Manganese flakes will then pass through a sieve, where they will be divided into fine and coarse fractions.

The obtained manganese will be transported in transport boxes to the EMM dissolution unit (B15) for processing into manganese sulphate monohydrate, or it will be packed in bags and shipped for sale.

The spent anolyte still contains a significant amount of manganese and sulfuric acid. The solution will be recycled back into the concentrate leaching circuit. This method of processing eliminates manganese losses and reduces the amount of waste produced.

The disadvantage of anolyte recycling is that the concentration of magnesium sulphate in the system gradually increases. Gradual accumulation of magnesium sulphate in the electrolyzed solution would have negative consequences on the electrowinnig process, e.g. clogging of anode membranes or pipes. Therefore, part of the anolyte solution (approximately 50 %) will be treated in a separate Mg removal device (B08) so as to maintain the concentration of magnesium throughout the leaching and electrowinnig system below the maximum acceptable value.

During the electrowinnig process, various gases (hydrogen, oxygen, ammonia, water vapor) will be formed, which can pull trace amounts of the electrolyte. In order to protect the environment and the health of workers, electrolytic cells with side exhaust ventilation will be used. The gas from each electrolyser will be sucked separately by four fans into four scrubbers, where the gas will be cleaned of ammonia and aerosol of the electrolyte. The scrubbers (B27) are located on the east side of the electrowinnig workshop (B07).

The solution from the gas scrubbers will be processed in the ammonia recovery circuit. The purified off-gas will be discharged into two chimneys and discharged into the atmosphere (B-27-V). During electrowinning, a small amount of anodic sludge will be formed, which will contain manganese dioxide from the oxidation of manganese and a smaller amount of lead, tin and silver compounds (from the dissolution of anodes). This anode slime, which is not processable by the proposed technological process, will be collected from where it will be periodically pumped out. The collected anode slime will be filtered and washed, and then recycled or processed by authorized companies outside the premises of Manganese Chvaletice.

Dewatering and washing of the leach residue (B09)

The drained leach residue from the iron/phosphorus removal circuit (B05) still contains significant amounts of manganese sulphate and other salts (for example, ammonium sulphate). These salts need to be recovered and returned to the production process.

The leach residue cake from the iron/phosphorus removal circuit (B05) will be washed using process water and then pumped into the replulping and washing process in a separate facility (B09). The leached sludge will be collected in buffer tanks before the pressure filtration is carried out. On-stream washing and process water will be used to wash the filter cake. The thoroughly washed cake together with the NMT will be transported by a closed belt conveyor to the raw material storage (B01) and then transported to the secure NMT/LR residue storage facility.

The washing solution from the washing process will be processed in separate circuits with the aim of recovering ammonia and manganese.

Ammonia (B10) recovery

The supernatant from the LR washing circuit will be subject to two separate treatments to recover manganese and ammonia. The scrubbed off-gas collected from the leach circuit, which contains mainly carbon dioxide, will be sparged at a controlled rate to the reactor, where the manganese will react with the carbon dioxide to form manganese carbonate precipitate. Ammonia water is added to maintain the optimum pH for the manganese recovery process. The solution from the manganese precipitation circuit will be processed by a slurry-steam stripping process to recover ammonia for reuse in various process circuits.. The addition of hydrated lime to the filtrate releases ammonium ions and produces calcium sulphate. Ammonia will be released from the slurry by steam. The mixture of water vapor and ammonia will be cooled in cooling condensers, then about 10% aqueous ammonia solution (ammonia water) will be produced in the absorption towers. The aqueous ammonia solution will be reused in the production process as a reagent for pH adjustment of solutions. The off-gas from the absorption towers will be washed in a scrubber (B10-V) and then discharged into the atmosphere.

The solid part of the Ammonia recovery process consists mainly of calcium sulphate (CaSO4*2H2O) or gypsum. After filtration, the material will be applied on the market as chemogypsum.

The filtrate from the gypsum drainage circuit will be returned to the industrial water circuit.

Control of magnesium concentration in the system (B08)

Returning the anolyte to the process would cause a gradual increase in magnesium concentration in leaching and electrowinning circuits. An increased concentration of magnesium sulphate would cause technological difficulties and therefore it is necessary to keep the magnesium concentration below 10 g/l. For the removal of magnesium, the triple salt method (manganese-magnesium-ammonium sulphate) will be used.

It is anticipated that approximately 50% of the anolyte will be processed in the Mg removal unit (B8). The processed anolyte will be mixed with the unprocessed anolyte and this mixture will be used in the leaching process. The products of the Mg removal process will be manganese carbonate and magnesium carbonate. Manganese carbonate will be added to the leaching process.

Magnesium carbonate is expected to be used as a by-product in agriculture as part of fertilizers, material for the production of refractory materials or will be handed over to authorized companies outside the premises of Manganese Chvaletice for further processing or disposal.

The filtrate obtained from the magnesium precipitation circuit contains mainly ammonium sulphate. This solution will be evaporated using a mechanical vapour recompression system (MVR). Subsequent crystallization will yield ammonium sulphate, which will again be used for the crystallization of the triple salt. The condensate obtained from the evaporation / crystallization circuit will be used in the industrial water circuit. The off-gas from the manganese and magnesium precipitation process will be discharged into the atmosphere after passing through the scrubber.

Disposal of residues (mining waste)

The NMT filter cake from the magnetic separation circuit and the washed LR filter cake will be stored in the residue storage facility (RSF) located in the area of the original tailings.

The RSF is designed in accordance with current regulations with the aim of eliminating negative impacts on groundwater and the surroundings of the repository. The bottom of the repository will be lined with an impermeable waterproofing film to prevent possible seepage into the groundwater. The stored material will also be covered with a waterproofing foil from the top to prevent rainwater from seeping into the material (a large amount of water in the material could cause destabilization of the storage). The top waterproofing membrane will be covered with earth and greened. Material storage and reclamation will take place in parallel with the extraction of raw material from tailings.

Dissolution of metallic manganese (B15)

EMM flakes obtained from the electrowinnig process will be dissolved in closed reactors in a dilute sulphuric acid solution at temperatures between 60 °C and 80 °C for 8 to 12 hours (B15). The reaction of metallic manganese with sulfuric acid produces manganese sulphate. The dissolution process takes place in two stages:

1. Dissolving manganese flakes in a slight excess of sulfuric acid
2. Removal of excess acid by addition of fine particles of metallic manganese obtained from the dedusting of the manganese peeling unit of cathodes (B07).

The resulting solution will be pumped to the next stage (B16), where it will be purified. When dissolving metallic manganese in sulfuric acid, hydrogen gas will be formed. Hydrogen gas after purification will be used as a clean energy source for steam generation (B13). Steam will be used for drying the resulting product and regenerating ammonia. In addition to hydrogen combustion, natural gas will also be used to produce steam.

Purification of manganese sulphate (B16) solution

The manganese sulphate solution prepared by dissolving the manganese in the previous stage has a purity above 99.9%, but it still contains trace amounts (in concentrations of units up to tens of ppm) of some metals, especially zinc and iron.

To obtain high-purity manganese sulphate monohydrate, the content of these metals needs to be further reduced. The purification process (B16) will take place in two steps:

1. Removal of zinc and similar metals by sulphide precipitation using barium sulphide
2. Removal of iron by oxidation of ferrous ions by oxidation using a solution of diluted hydrogen peroxide (insoluble compounds of trivalent iron will precipitate).

Each of the above purification operations will be followed by filtration. The resulting filter cakes will be washed separately, filtered and handed over to an authorized person for recovery or disposal.

The purified solution will be pumped into the Manganese sulphate (B17) evaporation and crystallisation unit.

Evaporation, crystallisation, and packaging of manganese sulphate (B17)

The purified manganese sulphate solution will be concentrated in an evaporator with a mechanical vapour recompression system (MVR). The chosen evaporation system is much more energy efficient compared to conventional multiple evaporation systems. The evaporated water will condense and be reused in the EMM dissolution process.

After sufficient concentration of the solution in the evaporator, it will be pumped into a crystallizer (2 units), where crystallization will take place. Manganese sulphate crystals will be separated from the mother solution by centrifugation. Part of the mother solution will be returned to the evaporation circuit, the other part to the purification circuit of the manganese sulphate solution. The centrifuged crystals will be dried in disc ovens at approximately 140 °C.

The dried manganese sulphate crystals will be transported to the product storage and packaging area (B17). MSM will be filled in automatic packages into bags weighing 1 t and 25 kg. Bags with packaged MSM will be stored in the product warehouse (B20).

System for the use of hydrogen from the dissolution of metal manganese, production of technological steam, use of superheated heating water from an adjacent power plant (B13)

The process of dissolving metallic manganese will produce approximately 1,250 tons of hydrogen gas per year. The obtained hydrogen gas will be purified in a closed scrubbing (hydrogen may contain an aerosol of solution) and passed into a buffer tank. From there, it will be fed into a special boiler allowing hydrogen to be burned, the heat generated will be used to produce steam.

Since the amount of heat generated by burning hydrogen would not be sufficient for the needs, additional steam will be generated in standard boilers that burn natural gas. The steam will be used mainly for drying the final product and in the Ammonia recovery process.

For applications where the target heating temperature is lower than approx. 100^{o}C (e.g. leaching, manganese dissolution, hot water preparation and heating), superheated water (10 bar, 130 ^{o}C) will be used.

Product Shipping

Products in the form of manganese metal and manganese sulphate monohydrate will be packed separately in their own facilities (B07 and B17) according to customer requirements (25 kg bags, 1 t bulk bags or bulk product) and will be shipped by rail or road transport. A dedicated warehouse of products (B20) will be built for temporary storage of products.

The individual raw materials and chemicals used in the above processes are listed in the table below, including their annual consumption and stored quantity.

Table No. 21: Annual consumption of raw materials and chemicals - technological process of the processing plant

Chemicals / Raw material	Chemical formula	CAS	Annual consumption (t)	Quantity stored
Sulfuric acid	H2SO4	7664-93-9	183 000	Total storage capacity of tanks approx. 6,350 t
Ammonium sulphate	$(NH4)_2SO4$	7783-20-2	750	It will not be stored, the initial filling, and then it will regenerate
Ammonium bisulphite, 70 % solution	(NH4)HSO3	17026-44-7	3 120	Total storage capacity of tanks approx. 77 t
Sodium dimethyldithiocarbamate, 40% solution	C5H10NS2Na	128-04-1	870	Total tank storage capacity approx. 66 t
Ammonia water, 25%	NH3 (so)	1336-21-6	1 555 (approx. 100 t at the start of the technological process)	Total storage capacity of the tank approx. 90 t
Flokulant	polymer based on acrylamide and sodium acrylate (anionic polyacrylamide)		67	Total stored material quantity approx. 8 t
Flocculant - PAM	Powder		10	Total stored material approx. 4 t
Calcium oxide	CaO	1305-78-8	75 000	Total tank storage capacity approx. 2,181 t
Barium sulphide	BaS	21109-95-5	1080	Total tank storage capacity approx. 82 t
Activated carbon	C	7440-44-0	350	Total stored quantity approx. 50 t
Sodium hydroxide	NaOH	1310-73-2	400	As a general rule, the quantity stored shall not exceed 1 t
Antiscalant			cca 2	As a general rule, the quantity stored shall not exceed 1 t

Chemicals / Raw material	Chemical formula	CAS	Annual consumption (t)	Quantity stored
Ferrous sulphate	$FeSO_4$	7720-78-7	1	As a general rule, the quantity stored shall not exceed 1 t
Hydrogen peroxide	H_2O_2	7722-84-1	20	According to the capacity of storage IBC containers
Technical sodium silicate solution (water glass)	$Na_2O(SiO_2)_x \cdot xH_2O$	1344-09-8	150	29 t (22 IBC)
Sodium carbonate	Na_2CO_3	497-19-8	10	As a general rule, the quantity stored shall not exceed 1 t

Time funds and shifts in part of the plant

The number of working days in the processing plant will be 333 days per year. The working day is divided into three working shifts. One shift has 8 working hours. Working hours in the morning shift are 6:00 – 14:00, in the afternoon shift 14:00 – 22:00, in the night shift 22:00 – 6:00.

Table No. 22: Working time fund - processing plant

Number of shifts	3	shifts / day
Shift length	8	hours
Number of working days in a year	333	days / year
Number of working hours in a year	8000	hours / year

The number of employees and their division into shifts is shown in the following table.

Table No. 23: Shift: mining part + processing plant

	1st shift	2nd shift	3rd inning	weekend	total
Production staff	145	80	45	90	360
THP	70	2	2	2	76
Total	215	82	47	92	436

Construction of a processing plant

The construction of the plant (including preparatory activities) will take place in a period of about 4 years.

Working hours in the implementation of activities will depend on the nature of the work, climatic conditions of the type of mechanization used, etc. In general, it will be the following categories of operation:

- One-shift operation:

- Deforestation, chipping, overburdening, etc., i.e. work that is carried out during the period of dormancy (short daylight hours) will be carried out in the mode of 1-day shift / 5 or 6 working days a week.

- Two-shift operation:
  - It will be used for large-scale work – landscaping in the processing plant, construction of siding, construction of a processing plant and quarry facilities. The work will be carried out in the mode of 2 working shifts / day, 5 days a week or using the day shift on Saturday.
  - Work activities are expected from 7:00 a.m. to 9:00 p.m. – the beginning of the first and end of the second shift is used to prepare and clean the construction site.
- Three-shift operation:
  - It will / can be used for assembly and interconnection of technological equipment. However, such works take place inside already completed buildings and are not a source of noise.

Individual stages of the construction of the processing plant:

1. *Deforestation of the processing plant area*

The area of the future processing plant is partially forested. In the vast majority of cases, the wooded areas are made up of self-seeded trees, which expanded here after the end of the industrial activities of the former pyrite mining plant. For the construction of the new plant, it will be necessary to deforest the area. A list of techniques used to deforest the area is given in the Table No. 24.

The largest continuous wooded area occurs on the western sloping part of the plot (Semenná hůrka). Currently, in this area there is a deciduous forest with a fairly dense undergrowth (raspberry, blackberry, rosehip, etc.). In the southern part of the complex there are larger islands of self-seeded trees, especially at the border of the plot with the concrete plant (TIBA BETON CZ, s.r.o.) and in the area of the former trackage (the border of the land with the track of the Sev.en power plant). In addition to the above-mentioned larger areas, there are smaller groups or solitary self-seeded trees and, sporadically, targeted trees. A detailed description of woody plants is given in the Dendrological Study.

Felling of trees will be carried out during the period of dormancy and nesting rest (expected winter 2023-2024). The total duration is planned for 16 weeks.

Progress of work:

- Felling and branching will be carried out using the harvester (a chainsaw will be used in inaccessible areas and/or for very thick branches).
- The obtained wood material will be sorted into two groups: material for chipping and logs for transportation. For logistical reasons, several wood chip dumps will be used.
- The removal of logs from the area will be carried out periodically by trucks.
- The mass for chipping will be processed by a chipper (filling with a loader with a hydraulic hand). The wood chips are then transported by tipping truck to the hopper of the belt conveyor for the transport of material to the tailings area. Loading of wood chips on trucks will be carried out either directly by a chipper or by means of a horizontal loader (more likely variant). The wood chips into the belt conveyor hopper will be dumped directly from the truck (preferred option) or from the intermediate depot by a horizontal loader.

Table No. 24: List of techniques used for deforestation of the processing plant site

Název stroje	Počet strojů	Doba použití	Denní využití	Pozn.
		týdny	h/den	
Harvester	1	4	8	
Nákladní automobil - odvoz klád	6	2	periodicky	jen odvoz
Štěpkovač	1	10	8	
Nakladač s hydraulickou rukou (pro štěpkovač)	1	10	8	
Kolový nakladač	1	10	6	
Nákladní automobil - sklápěčka	1	10	6	
Motorové pily	2	12	periodicky	dle potřeby

Notes:

- *The usage time indicates the maximum operating time of the machine for the implementation of the entire project (including non-working days due to climatic and technological reasons). In case of favorable circumstances, the work may be completed earlier.*
- *Daily usage means the maximum number of working hours per day (not working hours at the workplace).*
- *These machines and equipment will be used as needed. The concurrence of operation of all devices can be considered the worst case, however, this is a condition that will occur rather rarely.*

2. Relocation of utility networks

The area of construction of the future processing plant (the current plant of EP Chvaletice) is connected to engineering networks (drinking water, fire hydrant network, medium-pressure gas pipeline, 22 kV electricity connection, telephone cable, sewage and rain sewerage). These networks will have to be relocated (e.g. telephone cable) before the start of earthworks, temporarily blinded at the boundaries of the plot (e.g. fire hydrant network, gas connection) or prepare temporary connection points on the land boundaries for use during plant construction (drinking water, 22 kV connection). In all cases, these are minor acts. A list of techniques used for relocation of technical networks is given in the Table No. 25. The total duration is planned to be about 20 weeks.

Table No. 25: List of techniques for relocation of technical networks on the premises of the processing plant

Název stroje	Počet strojů	Doba použití	Denní využití	Pozn.
		týdny	h/den	
Traktorbagr	1	4	8	periodicky
Malý horizontání nahladač	1	4	8	periodicky
Nákladní automobil	1	4	8	periodicky
Řezač betonu/asfaltu	1	2	6	periodicky
Zařízení pro zemní protlaky	1	2	6	periodicky
Drobná mechanizace a ruční nářadí	xx	8	periodicky	periodicky

Notes:

- *The usage time indicates the maximum operating time of the machine for the implementation of the entire project (including non-working days due to climatic and technological reasons). In case of favorable circumstances, the work may be completed earlier.*
- *Daily usage means the maximum number of working hours per day (not working hours at the workplace).*
- *These machines and equipment will be used as needed. The concurrence of operation of all devices can be considered the worst case, however, this is a condition that will occur rather rarely.*

3. Construction of a part of the technological bridge

During deforestation, demolition of existing buildings in the Chvaletice EP area and earthworks in the Chvaletice EP area, approximately 650,000 m3 of materials (wood chips, sorted recyclate from demolition, sorted soil and aggregates from landscaping) are created. These materials will be used for the preparation and reclamation of the future mining waste repository (embankment of the repository base, reinforcement of roads, backfilling of the upper insulation layer, fertilization of the upper insulation layer, etc.). Material recovered from the area of the future processing plant must be transferred (before construction starts) to the mining/mining waste repository area.

The processing plant and mining areas are separated by road no. 322 and the railway corridor. The nearby railway crossing Trnávka has a small insufficient capacity for the relocation of the above-mentioned amount of material. For this reason, and in order to minimize the traffic burden on local roads, the transport of material using a belt conveyor located on a closed technological bridge (cross-section of about 2x2 m), which crosses the road and the railway corridor and connects both parts of the project.

Wood chips, recyclate and other materials will be transported by belt conveyor to the area of the former tailings. Here, these materials will be loaded by a horizontal truck loader and transported to an intermediate deposit about 1,200 m away (the area between the port and the protected deposit area of the tailings). Traffic will take place on an existing non-public asphalt road.

Progress of work:

- Preparation of foundations for bridge load-bearing columns (piling).
- Assembly of individual parts of the bridge structure from segments (made outside the installation area).
- Installation of vertical supports of the bridge structure.
- Installation of assembled horizontal parts of the bridge structure.
- Installation of a belt conveyor.
- Final and finishing work.

The list of techniques used for the construction of the technological bridge is given in the table (**Chyba! Chybný odkaz na záložku.**) below. The total duration will be about 20 weeks.

Table No. 26: List of techniques for the construction of a technological bridge

Název stroje	Počet strojů	Doba použití	Denní využití	Pozn.
		týdny	h/den	
Vrtací jednotka	1	2	10	
Horizontání nakladač	1	3	8	periodicky
Nákladní automobil	1	20	periodicky	dovoz materiálu, odvoz materiálu z vrtů
Domíchávač betonu	1	2	periodicky	základy mostu
Jeřáb	1-2	10	periodicky	instalace mostu
Vysokozdvižná plošina	1-2	3	periodicky	instalace mostu a opláštění
Drobná mechanizace a ruční nářadí	xx	20	periodicky	periodicky

Note:

- *The usage time indicates the maximum operating time of the machine for the implementation of the entire project (including non-working days due to climatic and technological reasons). In case of favorable circumstances, the work may be completed earlier.*
- *Daily usage means the maximum number of working hours per day (not working hours at the workplace).*
- *These machines and equipment will be used as needed. The concurrence of operation of all devices can be considered the worst case, however, this is a condition that will occur rather rarely.*

4. *Demolition of existing buildings in the Chvaletice EP complex*

The construction of the manganese processing plant will take place on the territory of the former pyrite concentrate production plant, now the EP Chvaletice premises. Almost all existing buildings will be removed. Due to the long history of the site, the construction of the buildings is very different – monolithic concrete, prefabricated concrete panels, brick masonry, concrete skeleton/masonry, steel skeleton/masonry, sandwich panels, wood, etc. For this reason, it will be necessary to use a wide range of mechanization for demolition work.

The method of carrying out demolition work and the inventory of the generated waste in terms of their quantity and type is the subject of a separate study (Šarman, 2021), which also included a construction-technical survey with regard to the occurrence of asbestos.(Balvín, 2021)

One of the goals of demolition is to minimize waste generation and maximize the use of materials from demolition. Materials that are not usable in the next phase of the project (e.g. scrap metal or glass) or are waste (cables, asphalt strips, sandwich panels, etc.) will be handed over for processing and/or disposal to dedicated facilities.

Clean construction debris will be crushed, sorted into fractions and the resulting recyclate will later be used as embankment and backfill material for the construction of the mining waste repository. The individual fractions of the recyclate will be transported by belt conveyor to the mining/repository area and stored in an intermediate depository.

A list of the techniques used for the demolition of existing buildings on the premises of the processing plant is given in the Table No. 27. The total duration of the demolition of the existing buildings is planned to be 20 weeks.

Progress of work:

Demolition activities will take place in parallel in order to optimize capacities. The following list is a list of the main activities, not a workflow.

- Dismantling of utilities, windows, doors and other demountable parts of the building. Sorting and removal of these materials/wastes.
- Dismantling of the roof structure, sorting and removal
- Demolition of the brick part of the building and sorting of the obtained material (separation of coarse impurities from masonry).
- Crushing of construction debris, sorting of grit – the formation of several fractions of recyclate.
- Transport of recyclate to intermediate deposits.

Table No. 27: List of techniques for demolition of existing buildings on the premises of the processing plant

Název stroje	Počet strojů	Doba použití týdny	Denní využití h/den	Pozn.
Hydraulický bagr	2	14	8	demolice + manipulace s materiálem
Hydraulické nůžky	2	10	8	demolice
Hydraulické kladivo	2	8	8	demolice mimořádně pevných konstrukcí
Buldozer	1	14	8	demolice + manipulace s materiálem
Horizontální nakladač	3	18	8	manipulace s materálem
Mobilní jeřáb	2	14	8	demontáž
Vysokozdvižná plošina	4	16	8	demontáž
Nákladní automobil - odvoz odpadu	3	18	periodicky	
Nákladní automodil - interareálová přeprava	2	18	8	
Recyklační jednotka pro recyklaci stavebí suti	1-2 [1)]	18	8	
Drobná mechanizace a ruční nářadí	xx	20	periodicky	periodicky

Note:

- *The usage time indicates the maximum operating time of the machine for the implementation of the entire project (including non-working days due to climatic and technological reasons). In case of favorable circumstances, the work may be completed earlier.*
- *Daily usage means the maximum number of working hours per day (not working hours at the workplace).*
- *These machines and equipment will be used as needed. The concurrence of operation of all devices can be considered the worst case, however, this is a condition that will occur rather rarely.*

5. *Fieldwork in the area of the processing plant*

The western part of the site is sloping, after deforestation it will be necessary to excavate relatively large volumes of soil / rock in order to build a railway yard and its technological facilities. In other parts of the future site, the amount of material that needs to be excavated to achieve the required terrain profile is small/none; Embankment will be carried out in several places.

The total amount of material that will need to be excavated is approximately 600,000 m3. The total duration of the fieldwork in the processing plant area is planned to be approximately 26 weeks.

The excavated material will be crushed, sorted and, depending on the fraction and type of material, will be used in the preparation and reclamation of the mining waste repository.

As it is an old industrial site – there is no topsoil layer in the area. Locally there is a layer of fertilizable soil; This will be removed and processed separately.

Progress of work:

- Hiding a thin layer of fertile soil, which occurs in places in the central part of the site.
- Pulling out stumps and hiding the surface fertile layer of soil in the western area of the plant (the area that is currently forested). Mechanization – bulldozer in a ripper, hydraulic excavator.
- Excavation of a layer of weathered rock. Mechanization – hydraulic excavator.
- Excavation of unweathered rock. Mechanization – hydraulic hammer.
- Excavation of the original railway substructure. Mechanization – hydraulic excavator.

- The excavated material will be continuously crushed and sorted. 3 types of material are expected (fertilizable soil with wood chips, "soft backfill material" from weathered rock and hard aggregate from unweathered rock) and 3 fine fractions.
- The recovered material will be transported to the mining and deposition area and stored for later use in an intermediate deposit. A smaller amount of material will be used directly on the premises to carry out embankments.
- Part of these earthworks will also be securing the excavated wall in the SW part of the land. Piles and/or anchors will be used (depending on geological evaluation).

A list of the techniques used is given in the table below:

Table No. 28: List of techniques for fieldwork on the premises of the processing plant

Název stroje	Počet strojů	Doba použití	Denní využití	Pozn.
		týdny	h/den	
Hydraulický bagr	2	14	8	
Hydraulické kladivo	2	20	8	koncová fáze zemních prací
Buldozer	2	8	8	počáteční fáze zemních prací
Horizontální nakladač	3	24	8	
Nákladní automobil - interareálová přeprava	3	24	8	
Nákladní automobil - dovoz materiálu	1	6		
Recyklační jednotka pro recyklaci stavební suti	2	24	8	
Vrtná souprava	1	12	8	zajištění stěny
Domíchávač betonu	1	8	periodicky	zajištění stěny
Drobná mechanizace a ruční nářadí	xx	26	periodicky	

<u>*Note:*</u>

- *The usage time indicates the maximum operating time of the machine for the implementation of the entire project (including non-working days due to climatic and technological reasons). In case of favorable circumstances, the work may be completed earlier.*
- *Daily usage means the maximum number of working hours per day (not working hours at the workplace).*
- *These machines and equipment will be used as needed. The concurrence of operation of all devices can be considered the worst case, however, this is a condition that will occur rather rarely.*

6. *<u>Inter-depots for material obtained during fieldwork and demolition of buildings</u>*

During removal and landscaping, materials will be created that will later be used for the preparation and reclamation of the mining waste repository.

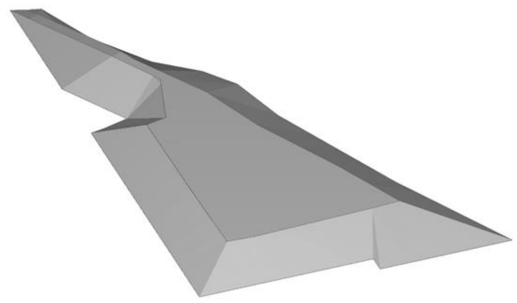
During demolition activities, about 50,000 m3 of certified recycled material (fractions 0-16, 16-32 and 32-61mm) and about 600,000 m3 of crushed soil (fractions 0-16, 16-32 and 32-61mm) and about 500 m3 of wood chips are produced. The above-mentioned materials will be produced in the processing plant, transported to the mining area, stored in an intermediate deposit and gradually used for reclamation.

Method of construction of interdepots:

- The sorted recyclate, soil or wood chips will be collected in the processing part of the plant.
- From there, they will be transported by means of a horizontal loader and truck to the hopper of the conveyor belt leading over the technological bridge to the raw material extraction area to the handling area at the end of the conveyor.
- From the handling area, the material will be loaded by a horizontal loader onto a truck and transported along the existing paved purpose-built road (non-public) to the inter-

deposit on the SW side of the mining area. Individual types and fractions will be stored separately.

- The area of the interdepot is 62,160 m2, the maximum capacity is 777,580 m3. The total amount of stored materials is 650 000 m3.



- The material from the interdepot will be gradually used for the rehabilitation of the repository.

7. *Construction of a railway siding*

A new siding will lead to the northeastern part of the plot, which will be used for supplying input raw materials and shipping products. The siding will be connected to the existing siding used to supply the Chvaletice power plant. The siding will be used to transport bulk raw materials to the plant and transport products from the plant.

The investor plans to build a siding in advance of the actual construction of the processing plant so that the material for the construction of the plant can be transported partly by rail transport.

In the affected area there are impassable tracks of the former plant Energostroj n.p. Chvaletice, which, however, cannot be restored due to the proposed plan due to the different directional and height solution of the complex. The connection of the Mangan Chvaletice s.r.o. yard to the siding of the Chvaletice Power Plant is designed in the place of the existing track 1. The siding tracks are designed as handling, i.e. with operation in the form of shunting and its control by marshalling signals. It includes transshipment equipment for handling and bottling raw materials.

The construction of the railway siding can be divided into 3 stages, where different machines and equipment will be used at each stage:

- Phase A — Earthworks and construction of the railway substructure
- Phase B — Installation of the railway superstructure
- Phase C — Installation of control and signalling systems, connection with the Sev.en siding

Progress of work:

Phase A:

- Rough fieldwork (excavation of the terrain in the western part of the plot.
- Removal of the old railway substructure in the central and eastern part of the plot, levelling of the terrain for the new trackage.

- Installation of passages for future utilities (the yard will be crossed, for example, by rain and sewage sewers, gas connections or drinking water), a rail drainage system and networks for the needs of siding.
- Construction of the railway substructure.
- Commencement of construction of a technical building/workshop and a diesel filling station for the needs of siding.

Phase B:

- Construction of the superstructure.
- Installation of nets for the needs of siding.
- Technical building and siding facilities – completion and connection to the network.

Phase C:

- Installation of security and signalling equipment, lighting and other auxiliary systems.
- Inspection and commissioning.

The technique used in the various stages of construction of the railway siding is shown in the following tables (Table No. 29, Table No. 30, Table No. 31). The total construction time of the railway siding is planned for 48 weeks.

Table No. 29: Technology used for the construction of railway siding - Phase A

Název stroje	Počet strojů	Doba použití	Denní využití	Pozn.
		týdny	h/den	
Hydraulický bagr	2	12	8	počáteční fáze
Buldozer	1	30	8	počáteční a střední fáze
Horizontální nakladač	2	40	8	
Nákladní automobil	4	44	periodicky	interní přeprava
Grader	1	12	8	závěrečná fáze
Válec	1	12	8	závěrečná fáze
Drobná mechanizace a ruční nářadí	xx	48	periodicky	

Table No. 30: Technology used for the construction of railway siding - Phase B

Název stroje	Počet strojů	Doba použití	Denní využití	Pozn.
		týdny	h/den	
Buldozer	1	20	8	
Horizontální nakladač	2	30	8	
Nákladní automobil	8	40	8	doprava materiálu
Grader	1	12	8	
Válec	1	12	8	
Jeřáb	2	24		vykládka a instalace kolejových polí
Podbíječka	1	8		
Drobná mechanizace a ruční nářadí	xx	48	periodicky	

Table No. 31: Technology used for the construction of the railway siding - Phase C

Název stroje	Počet strojů	Doba použití	Denní využití	Pozn.
		týdny	h/den	
Vysokozdvižná plošina	1	12	8	
Drobná mechanizace a ruční nářadí	xx	48	periodicky	

Note:

- *The usage time indicates the maximum operating time of the machine for the implementation of the entire project (including non-working days due to climatic and technological reasons). In case of favorable circumstances, the work may be completed earlier.*
- *Daily usage means the maximum number of working hours per day (not working hours at the workplace).*

- *These machines and equipment will be used as needed. The concurrence of operation of all devices can be considered the worst case, however, this is a condition that will occur rather rarely.*

8. Construction of a processing plant

Several different technologies will be used for the foundation of technical buildings, depending on the load on the building and the bearing capacity of the terrain (western side of the site – bedrock, eastern part of the site – gravel). For production buildings, the use of belt or surface foundation is assumed, for areas with lower bearing capacity or for equipment with a large weight on a small area (e.g. magnetic separator) foundations with piles/micropiles. Technology bridges will mostly be based on piles/micropiles.

The main technological buildings will be, in most cases, two-storey, where the second floor will be load-bearing and will carry reactors that will penetrate it into the space above the first floor. For this reason, the lower part of the building and the second floor will be load-bearing, so they will bear a substantial part of the weight of the equipment.

The lower part of the building and the first floor will have a monolithic concrete structure, or they will be a combination of prefy and monolithic concrete. The upper part of the building will then consist of a skeleton structure with filling (aerated concrete blocks and/or sandwich slabs). The roofs will be sandwiching roofs supported (depending on the span) by concrete or metal lintels. Auxiliary one-storey buildings (warehouses, etc.) – skeleton construction filled with sandwich panels. Administrative buildings – skeleton brick construction. The design of buildings must respect the results of an acoustic study. This means that for buildings where it is intended, natural ventilation through the fillings of the openings will not be possible, but forced ventilation will be proposed. Building envelopes will respect the requirements for sound absorption. This is also how the measures to minimize the effects in Chapter D.IV are designed.

The building material will be transported by road using resources in the vicinity. The construction of a concrete plant on the construction site is not planned. The technological equipment will be transported partly by road, partly by rail.

Work on the construction of the processing plant will take place in 3 main stages:

- Phase A: foundation and building shells
- Phase B: installation of building envelopes and roofs, final construction work
- Phase C: installation of internal networks and wiring, installation and wiring technological equipment, final outdoor work

Note:

- *Due to the extent of the work and the size of the construction site, the individual phases will partially overlap (= phase B will already be in one part of the construction site, while phase A will take place in another part).*
- *Outdoor networks will be partly routed over a technological bridge and partly underground. Their construction will take place in parts in connection with other works and so that the installation of networks does not restrict the construction of buildings.*
- *The construction of roads will also be carried out in phases so as to, on the one hand, allow good access to the construction site and minimize pollution of the public road, and, on the other hand, allow the laying of networks before the completion of the roads and prevent damage to the road by belt mechanisms. The roads will be built in the final positions, but the final layer (asphalt/concrete) will be laid only after the end of heavy construction activities, i.e. during the end of phase B and during phase A.*

The total construction time of the processing plant is planned to be 48 weeks.

Progress of work:

Phase A:

- Rough fieldwork
- Creation of terrain terraces
- Excavation work for the foundation of buildings, piling (if used)
- Construction of building foundations
- Construction of the load-bearing part of buildings
- Installation/construction of the load-bearing skeleton of the building and the supporting structure of the roof

Phase B:

- Lining of the skeleton, installation of roofs, installation of windows and doors, interior and exterior final construction work
- Laying of utility networks
- Installation of wiring in buildings
- Finishing touches on buildings
- Start of road construction
- Rough landscaping

Phase C:

- Installation and interconnection of technological equipment
- Connection of technological equipment to networks
- Installation and interconnection of control and safety systems
- Final exterior adjustments (terrain, roads, sidewalks, lighting, greenery)

In tables Table No. 32 to Table No. 34, a list of the techniques that will be used in the various stages of the construction of the processing plant is given.

Table No. 32: Technique used for the construction of the processing plant - Phase A

Název stroje	Počet strojů	Doba použití	Denní využití	Pozn.
		týdny	h/den	
Hydraulický bagr	5	30	10	
Buldozer	2	30	10	
Vibrační válec	1	10	8	
Horizontální nakladač	2	48	10	
Nákladní automobil - vnitroareálová přeprava	3	48	10	
Nákladní automobil	10	48	12	doprava materiálu
Domícháváč betonu	5	30	10	
Vrtná souprava	1	12	12	počáteční fáze
Mobilní jeřáb	2	48	8	
Věžový jeřáb	5	36	12	
Mobilní plošina	5	36	12	
Systém na čerpání betonu	1	20	10	periodicky
Drobná mechanizace a ruční nářadí	xx	48	periodicky	

Table No. 33: Technology used for the construction of the processing plant - Phase B

Název stroje	Počet strojů	Doba použití	Denní využití	Pozn.
		týdny	h/den	
Hydraulický bagr lehký	2	40	10	
Vibrační válec	1	10	8	
Horizontální nakladač	2	48	10	
Nákladní automobil - vnitroareálová přeprava	3	48	10	
Nákladní automobil	10	48	12	doprava materiálu
Domíchávač betonu	2	10	10	
Mobilní jeřáb	3	48	8	
Věžový jeřáb	2	36	12	
Mobilní plošina venkovní	8	48	12	
Mobilní plošina venkovní	5	48	12	
Drobná mechanizace a ruční nářadí	xx	48	periodicky	

Table No. 34: Technology used for the construction of the processing plant - Phase C

Název stroje	Počet strojů	Doba použití	Denní využití	Pozn.
		týdny	h/den	
Vibrační válec	1	10	8	
Horizontální nakladač	2	48	10	
Nákladní automobil - vnitroareálová přeprava	3	48	10	
Nákladní automobil	10	48	12	doprava materiálu
Mobilní jeřáb	5	48	8	vykládka a instalace technologie
Věžový jeřáb	1	36	12	
Mobilní plošina venkovní	2	48	12	
Mobilní plošina venkovní	5	48	12	
Grader	1	4	12	
Finišer	1	4	12	
Válec	1	4	12	
Drobná mechanizace a ruční nářadí	xx	32	periodicky	

Note:

- *The usage time indicates the maximum operating time of the machine for the implementation of the entire project (including non-working days due to climatic and technological reasons). In case of favorable circumstances, the work may be completed earlier.*
- *Daily usage means the maximum number of working hours per day (not working hours at the workplace).*
- *These machines and equipment will be used as needed. The concurrence of operation of all devices can be considered the worst case, however, this is a condition that will occur rather rarely.*

Closure of the processing plant

The intention of the investor is to use the plant premises and infrastructure for other industrial purposes that will be current and in demand at that time. Due to the long life of the project, it is not possible to make a final decision on a specific method of use and this will be specified at the end of the life of the project. If the technology for processing manganese ore is no longer usable, it will be dismantled and sold to interested parties or handed over to a facility for waste disposal or recovery. It is not expected that in connection with the standard operation of the project there will be any environmental damage in the area of the plant, which would have to be removed after the closure of the operation.

e) Best available techniques (BAT) comparison

The set of facilities that is the subject of the evaluated project can be classified according to Annex1 of Act No. 76/2002 Coll., on Integrated Prevention, to ***category 2.5. Processing of***

non-ferrous metals — (a) production of non-ferrous raw metals from ore, concentrates or secondary raw materials by metallurgical, chemical or electrolytic processes.

Two BAT were identified for the "*Recycling of the Chvaletice – Trnávka tailings*" project:

- **Wastewater and waste gas treatment and management systems in the chemical industry**
- **Non-ferrous metals industry**

The conclusions for individual BAT are set out in the text below and in the tables (Table No. 35 and Table No. 36).

BAT - Wastewater and waste gas treatment and management systems in the chemical industry

The best available techniques (BAT) conclusions under Directive 2016/902 of the European Parliament and of the Council for common wastewater and waste gas treatment and management systems in the chemical sector apply to installations referred to in Directive 2010/75/EU. These best available techniques (BAT) conclusions cover the activities listed in sections 4 and 6.11 of Annex I to Directive 2010/75/EU, namely:

- Section 4: Chemical industry
- Section 6.11: Independently carried out wastewater treatment not covered by Council Directive 91/271/EEC and discharged by an installation carrying out activities covered by section 4 of Annex I to Directive 2010/75/EU.

These BAT conclusions also cover combined treatment of wastewater from different sources where the highest pollutant load arises from the activities covered by section 4 of Annex I to Directive 2010/75/EU.

Table No. 35: Comparison of the project with BAT – wastewater and waste gas treatment systems

1. Environmental management systems	
BAT 1 parameter:	**In order to improve the overall environmental performance, BAT is to implement and comply with an environmental management system (EMS).**
Device parameter:	The company has implemented planning, management and control procedures in accordance with the standards of the management system, the established system is not certified. Environmental values are summarized in a senior management statement.
BAT fulfillment:	BAT compliant
BAT 2 parameter:	**In order to facilitate the reduction of emissions to water and air, and to reduce water consumption, BAT is to establish and maintain an overview of wastewater and waste gas streams, which is part of the environmental management system (see BAT 1) and includes all of the following elements:** **(i) information on chemical manufacturing processes, including:** **(a) chemical reaction equations which include by-products;** **(b) a simplified representation of the workflow indicating the origin of emissions;** **(c) descriptions of the techniques involved in the process and wastewater/gas treatment at source, including their performance;** **(ii) information, as detailed as reasonably possible, on the characteristics of the wastewater stream, such as:** **(a) average values and variability of flow, pH, temperature and conductivity;** **(b) average load of relevant pollutants/parameters, their concentration and variability (e.g. COD/TOC, nitrogen forms, phosphorus, metals, salts, specific organic compounds);**

<table>
<tr><td></td><td>(c) data on bio-elimination (e.g. BOD, BOD/COD ratio, Zahn-Wellens test, potential for biological inhibition (e.g. nitrification));
(iii) information, as detailed as reasonably possible, on the characteristics of the waste gas streams, such as:
(a) average values and variability of flow and temperature;
(b) average pollutant load/parameters involved, their concentration and variability (e.g. VOC, CO, NOX, SOX, chlorine, hydrogen chloride);
(c) flammability, lower and upper explosion limits, reactivity;
(d) the presence of other substances which may affect the waste gas treatment system or operational safety (e.g. oxygen, nitrogen, water vapour, dust).</td></tr>
<tr><td>Device parameter:</td><td>Within the project, general and partial balances of wastewater and gas flows according to individual streams are processed.</td></tr>
<tr><td>BAT fulfillment:</td><td>BAT compliant</td></tr>
<tr><td colspan="2">2. Monitoring</td></tr>
<tr><td>Parameter BAT 3:</td><td>In the overview of wastewater streams, BAT (BAT 2) for the relevant emissions to water according to the inventory of wastewater streams (see BAT 2), is to monitor key process parameters (including continuous monitoring of wastewater flow, pH and temperature) at important points (e.g. inflow to pre-treatment and inflow to final treatment).</td></tr>
<tr><td>Device parameter:</td><td>Monitoring of key wastewater parameters within the project in accordance with applicable norms and standards is part of the proposed solution.</td></tr>
<tr><td>BAT fulfillment:</td><td>BAT compliant</td></tr>
<tr><td>BAT 4 parameter:</td><td>BAT is to monitor emissions to water in accordance with EN standards with at least the minimum frequencies specified below. Where EN standards are not available, BAT is to use ISO, national or other international standards to ensure that the data generated are of equivalent scientific quality.
<table>
<tr><th colspan="2">Substance/parameter</th><th>Norm</th><th>Minimum monitoring frequency</th></tr>
<tr><td colspan="2">Total org. carbon (TOC)</td><td>EN1484</td><td rowspan="7">Daily</td></tr>
<tr><td colspan="2">Chemical oxygen demand (COD)</td><td>Standard not available</td></tr>
<tr><td colspan="2">Suspended solids (NL)</td><td>EN872</td></tr>
<tr><td colspan="2">Total nitrogen (N_{total})</td><td>EN12260</td></tr>
<tr><td colspan="2">Total inorganic nitrogen (N_{anorg})</td><td>Different standards are available</td></tr>
<tr><td colspan="2">Total phosphorus (P_{total})</td><td>Different standards are available</td></tr>
<tr><td colspan="2">Adsorbable organically bonded halogens (AOX)</td><td>EN ISO 9562</td></tr>
<tr><td rowspan="6">Metals</td><td>Cr</td><td rowspan="6">Different standards are available</td><td rowspan="6">Monthly</td></tr>
<tr><td>Cu</td></tr>
<tr><td>Hg</td></tr>
<tr><td>Pb</td></tr>
<tr><td>Zn</td></tr>
<tr><td>Other metals, if applicable</td></tr>
<tr><td rowspan="3">Toxicity</td><td>Fish eggs (Striped Danio rerio)</td><td>EN ISO 15088</td><td rowspan="3">A decision shall be made on the basis of a risk assessment</td></tr>
<tr><td>Daphnia magna Straus</td><td>EN ISO 6341</td></tr>
<tr><td>Luminescent bacteria (Vibrio fischeri)</td><td>EN ISO 11348-1, EN ISO 11348-2 or EN ISO 11348-3</td></tr>
</table></td></tr>
</table>

		Duckweed (*Lemna minor*) **Algae**	**EN ISO 20079** **EN ISO 8692, EN ISO 10253 or EN ISO 10710**	**after initial characterisation**
Device parameter:	Emissions discharged into water will be monitored within the range of parameters described in the Water chapter with the minimum frequency specified by the relevant legislative regulations and applicable standards.			
BAT fulfillment:	BAT compliant			
BAT 5 parameter:	**BAT is to regularly monitor emissions of volatile organic compounds (VOCs) from relevant sources using an appropriate combination of techniques I-III or, if large volumes of VOCs are used, all I-III techniques.** **I. odour control methods (e.g. using portable apparatus according to EN 15446) related to correlation curves for the most important instruments;** **II. methods of optical gas imaging;** **III. calculation of emissions based on emission factors, regularly verified (e.g. every two years) by measurement.** **When dealing with large volumes of VOCs, a useful complementary technique to Techniques I to III is to regularly check and determine the amount of emissions from the installation using optical techniques based on absorption, such as differential absorption LIDAR (DIAL) or solar occultation flux measurement (SOF).**			
Device parameter:	Not relevant, there will be no VOC emissions as part of the technological process.			
BAT fulfillment:	-			
Parameter BAT 6:	**BAT is to regularly monitor odour emissions from relevant sources in accordance with EN standards.**			
Device parameter:	The project will not be a source of evaluable odor. The device is designed to be tight, process off-gases will be cleaned using the techniques described in the EIA documentation.			
BAT fulfillment:	BAT compliant			
3. Emissions to water				
BAT 7 parameter:	**In order to reduce water consumption and wastewater generation, BAT is to reduce the volume of wastewater streams and/or to reduce the pollution burden they cause, to increase water reuse in production processes and to recover and reuse raw materials.**			
Device parameter:	The project meets this BAT, see the description of the technology and water management within the project. The water system is designed so that water is used to the maximum. This is achieved by means of several water circuits, where the water emerging from one circuit is used in the next circuit. The result of the proposed system is that the amount of wastewater is only about 4% of the water inlet.			
BAT fulfillment:	BAT compliant			
Parameter BAT 8:	**In order to prevent contamination of unpolluted water and reduce emissions to water, BAT is to separate the uncontaminated wastewater streams from the wastewater that needs to be treated.**			
Device parameter:	The project meets this BAT, see the description of the technology and water management within the project. The streams of unpolluted water and wastewater shall be separated.			
BAT fulfillment:	BAT compliant			
BAT parameter 9:	**In order to avoid uncontrolled emissions to water, BAT is to ensure sufficient buffer retention capacity for wastewater under other than normal operating conditions, based on a risk assessment (taking into account e.g. nature of the disturbant, consequences of further treatment and the receiving environment) and to take other appropriate measures (e.g. control, cleaning, reuse).**			

Device parameter:	Water management security of the project is designed in accordance with applicable legislation and relevant standards. The system of catching, emergency and collection tanks is dimensioned with sufficient capacity. It is commented in detail in the chapter of water management of the EIA documentation.
BAT fulfillment:	BAT compliant
BAT parameter 10:	**In order to reduce emissions to water, BAT is to use an integrated wastewater management and treatment strategy that includes an appropriate combination of techniques in order of priority below.** **a) Integrated processes – designed to prevent or reduce the formation of water pollutants** **b) Capture of pollutants at source** **c) Wastewater pre-treatment – techniques to reduce pollutants before final wastewater treatment. Pre-treatment may take place at the source or in combined streams.** d) **End-of-the-line wastewater treatment — end-of-the-line treatment of wastewater through, for example, preliminary and primary treatment, biological treatment, nitrogen removal, phosphorus removal and/or final solid removal techniques prior to discharge into receiving water.**
Device parameter:	The above requirements are solved by using several separate water circuits, where the water emerging from one circuit enters the next circuit, where the "impurities" in the water are either used/processed (e.g. NH4+ or Mn++) in the ongoing technological step. The result of the design is minimal wastewater generation.
BAT fulfillment:	BAT compliant
BAT parameter 11:	**In order to reduce emissions to water, BAT is to pretreat wastewater containing pollutants that cannot be adequately removed during final wastewater treatment using appropriate techniques.** **Pre-treatment of wastewater takes place as part of an integrated wastewater management and treatment strategy (see BAT 10) and is generally needed to:** **— protection of final wastewater treatment plants (e.g. protection of biological treatment plants from inhibiting or toxic compounds);** **— removal of compounds that are insufficiently removed during final treatment (e.g. toxic compounds, poorly biodegradable/non-biodegradable organic compounds, organic compounds in high concentrations or metals during biological treatment);** **— removal of compounds that would otherwise be dispersed from the wastewater collection system into the air during final treatment (e.g. volatile halogenated organic compounds, benzene); — removal of compounds that cause other negative effects (e.g. corrosion of equipment, unintentional reaction with other substances; contamination of sewage sludge).**
Device parameter:	Not relevant, the above substances do not occur in the process or do not get into wastewater.
BAT fulfillment:	BAT compliant
BAT parameter 12:	**In order to reduce emissions to water, BAT is an appropriate combination of end-of-use water treatment techniques.** **Preliminary and primary cleaning** **a) Buffering** **b) Neutralization** **c) Mechanical separation** **Biological treatment** **d) Activated sludge process** **e) Membrane bioreactor** **Nitrogen removal** **f) Nitrification** **Phosphorus removal** **g) Chemical precipitation** **Final removal of solids** **h) Coagulation and flocculation**

i) Sedimentation
j) Filtration
k) Flotation

Device parameter:

The relevant steps described above are applied. In the process of industrial water treatment takes place

- Neutralisation (as needed)
- Precipitation (as needed)
- Sedimentation

Subsequently, the industrial water is still purified in the WWTP.

Evaluation of compliance with BAT limits:

Pointer	**Unit**	**Expected concentrations of pollutants**	**BAT according to NV401 (permissible - maximum)**	**BAT conclusions - wastewater and gas treatment (mg/l)**	**BAT note (BREF)**
As	mg/l	<0.02			
Ca	mg/l	<400			
With	mg/l	<0.04		0,005 - 0,05	To be used if emissions exceed 5 kg/year
Fe	mg/l	<0.8			
Mg	mg/l	<60			
Mn	mg/l	<0.45			
On	mg/l	<150			
Pb	mg/l	<0.002			
Zn	mg/l	<0.25		0,02 - 0,3	To be used if emissions exceed 30 kg/year
Hydrocarbons such as C10-C40	mg/l	<0.1			
Cl	mg/l	<150			
pH	-	6.5-7.5			
SO4	mg/l	<350			
CHSK-Cr	mg/l	<100	75 - 140	30 - 100	To be used if emissions exceed 10 t/year
BSK5	mg/l	<30	22 - 30		
NL	mg/l	<30	25 - 35	5 - 35	To be used if emissions exceed 3,5 t/year
NH4	mg/l	<20	12 - 20		
Ncelk	mg/l	<40		5 - 25	To be used if the emissions exceed 2,5 t/year
Total	mg/l	<2		0,5 - 3	To be used if emissions exceed 0,3 t/year

BAT fulfillment:	BAT compliant
4. Waste	
BAT 13 parameter:	**In order to prevent the generation of waste for disposal or, where this is not possible, to reduce its quantity, BAT is to develop and implement a waste management plan that is part of the environmental management system.**
Device parameter:	During the technical design of the project, considerable emphasis was placed on minimizing the amount of waste to be disposed of, both for ecological and economic reasons. For a description of the technology, see chapter Waste. The process is designed in such a way that the vast majority of potential waste is recovered/treated at a different process stage. This leads to minimized waste generation. Examples are circuits for the use of Mn++ from the scrubbing of the filter cake, the use of exhausted anolyte for leaching or the circuit for the reuse of ammonia.
BAT fulfillment:	BAT compliant
Parameter BAT 14:	**In reducing the amount of sewage sludge that needs to be further treated or disposed of and reducing its potential environmental impact, BAT is to use a combination of the following techniques:** **a) Adjustment** **b) Thickening** **c) Stabilisation** **d) Drying**
Device parameter:	Sedimentation and sludge dewatering is used in the process.
BAT fulfillment:	BAT compliant
5. Emissions to air	
Parameter BAT 15:	**In order to facilitate the capture of substances and the reduction of emissions to air, BAT is to close the sources of emissions and, where appropriate, clean the emissions.**
Device parameter:	• The vast majority of processes are carried out continuously or semi-continuously in closed reactors. • Raw materials and intermediate products are stored in closed containers, raw materials are stored in a closed hall. Free landfilling is not used. • The products are shipped in sealed packages. • TZL-containing gases are cleaned by passing through a hose filter before being released into the atmosphere, off-gases containing NH3 or sulfuric acid aerosol are cleaned by passing through a wet scrubber.
BAT fulfillment:	BAT compliant
Parameter BAT 16:	**In order to reduce emissions to air, BAT is an integrated waste gas management and purification strategy, which includes waste gas cleaning techniques integrated into the process.**
Device parameter:	The intention is in accordance with this BAT, see Description of Technology in Chapter B.
BAT fulfillment:	BAT compliant
Parameter BAT 17:	**In order to avoid emissions to air from incineration, BAT is to burn waste gas only for safety reasons or under abnormal operating conditions (e.g. start-up or shutdown) using those techniques.** **a) Proper design of the device** **b) Device control**
Device parameter:	In the process of dissolving manganese, hydrogen is formed. Hydrogen is used for steam production, its combustion on flaře will be carried out in accordance with BAT, i.e. only for safety reasons or under abnormal operating conditions (e.g. start-up or shutdown).

	Apart from hydrogen, no combustible exhaust gases are generated
BAT fulfillment:	BAT compliant
Parameter BAT 18:	**In order to reduce emissions to air from combustion when the combustion of waste gases cannot be avoided, BAT is to use one or both of the techniques listed below.** **a) Proper construction of combustion plants** **b) Monitoring and records within combustion management**
Device parameter:	See BAT 17 — no combustible waste gases are produced, except hydrogen.
BAT fulfillment:	BAT compliant
Parameter BAT 19:	**In order to prevent or reduce emissions of VOCs into the atmosphere where they cannot be avoided, BAT is a combination of these techniques.** **(a) Limitation of the number of potential sources of emissions** **(b) Maximising the elements of contained use within the process** **(c) Selection of equipment with high integrity** **(d) Facilitating maintenance by guaranteeing access to equipment that may be leaked** **(e) Guarantee of well-defined and comprehensive procedures for the design and installation of facilities/equipment. Includes the use of seals for defined pressure when installing flange joints** **(f) Ensuring stable procedures for the commissioning of facilities/equipment and for the transfer process in accordance with design requirements** **(g) Ensuring proper maintenance and timely replacement of equipment** **(h) Use of a risk-based leak detection and leakage detection (LDAR) program** **(i) To the extent practicable, to prevent diffuse emissions of VOCs, capture at source and clean**
Device parameter:	Not relevant, no VOCs are generated in the production process
BAT fulfillment:	-
BAT 20 parameter:	**In order to prevent or reduce odour emissions, BAT is to establish, implement and periodically review an odour reduction plan as part of the environmental management system; This plan shall include all of the following elements:** **i) a protocol containing the relevant measures and deadlines;** **ii) a protocol on the implementation of odour monitoring;** **iii) a protocol on reactions to odour detections;** **iv) an odour prevention and abatement programme designed to identify the source or sources of odour(s); alterations/estimates of odour exposure are carried out; the contribution of individual sources to the total odour is described; and measures taken to prevent or reduce odours. Associated monitoring is given in BAT 6.**
Device parameter:	The intention will not be a typical source of odour, no odour nuisance is expected – it is not relevant.
BAT fulfillment:	-
Parameter BAT 21:	**In order to prevent odour emissions from collection, treatment and sludge treatment or to reduce odour emissions where they cannot be eliminated in practice, BAT is to use one or a combination of the techniques listed below.** **a) Minimizing residence time** **b) Dry cleaning** **c) Optimizing aerobic cleaning** **d) Enclosed space** **e) Cleaning at the output of the device**
Device parameter:	The procedure for wastewater treatment is given in the chapter Water Management. Within the proposed method of wastewater treatment, BAT techniques are taken into account:

	a) Minimizing residence time – collecting and storing sludge in anaerobic conditions for the minimum necessary time. b) dry treatment of wastewater by established treatment processes, c) dry treatment of wastewater by established treatment processes, d) wastewater and sludge will be collected and treated indoors, taking into account operational needs, e) Proposed wastewater treatment also includes biological treatment, see the chapter Water Management
BAT fulfillment:	BAT compliant
Parameter BAT 22:	**In order to prevent or reduce noise emissions where this is not practicable, BAT is to establish and implement a noise reduction plan which is part of the environmental management system (see BAT 1), which includes all of the following elements:** **i) a protocol containing the relevant measures and deadlines;** **ii) a protocol on the implementation of noise monitoring;** **iii) a protocol on the response to the noise occurrences identified;** iv) **a noise prevention and reduction programme designed to identify the noise source(s); measurements/estimates of noise exposure are carried out; describe the contribution of each source to the total noise; and measures to prevent or reduce noise are implemented.**
Device parameter:	Noise reduction measures are designed based on the results of the Noise Study and are incorporated into the overall design of the project. For details, see the noise study and the chapter Noise.
BAT fulfillment:	Corresponds to BAT.
BAT 23 parameter:	**In order to prevent or reduce the amount of noise where it is not practically possible to eliminate it, BAT is to use one or a combination of the techniques listed below.** **a) Suitable location and equipment of buildings** **b) Operational measures** **c) Low noise equipment** **d) Noise control equipment** **e) Noise reduction**
Device parameter:	Noise reduction measures are designed based on the results of the Noise Study and are incorporated into the overall design of the project. For details, see the noise study and the chapter Noise. a) Suitable location of equipment and structures – the device is designed with a view to minimizing noise – priority placement of equipment with a higher noise level on the ground floor floors, covering or other appropriate measure to minimize noise. b) Extremely noisy devices are located (compressors) in soundproofed areas that separate these devices from other spaces. c) Operational measures – during routine inspections, emphasis will be placed on checking the tightness but also the noise level of the equipment. In the event of an increase in the noise level of the equipment, noisy parts will be repaired or replaced immediately in cooperation with maintenance. d) Equipment with low noise – when selecting the technology, one of the parameters of the device will be considered its noise. e) Noise control equipment – based on the results of the Noise Study, all necessary measures to reduce noise will be implemented – insulation of equipment, closure of noisy equipment, sound insulation of buildings. f) Noise reduction – irrelevant, this is a new device where the noise minimization requirement is already taken into account during the placement and construction of the device.
BAT fulfillment:	BAT compliant

BAT - Non-ferrous metals industry

Best available techniques (BAT) conclusions under Directive 2016/1032 of the European Parliament and of the Council for the non-ferrous metals sector. These BAT conclusions concern some of the activities listed in sections 2.1, 2.5 and 6.8 of Annex I to Directive 2010/75/EU, and for the project under consideration, specifically:

- 2.5.: Processing of non-ferrous metals: (a) production of non-ferrous raw metals from ore, concentrates or secondary raw materials by metallurgical, chemical or electrolytic processes.

The production of manganese and manganese sulphate is not specifically mentioned in the Best Available Techniques (BAT) conclusions under Directive 2016/1032 of the European Parliament and of the Council for the non-ferrous metals sector. No BAT process is reported that would cover or reasonably relate to the production of electrolytic manganese metal and manganese sulphate. The project under assessment was evaluated with general conclusions on best available techniques and at the same time BAT was identified for the production of the non-ferrous metals mentioned (copper, nickel, rare metals, etc.) that can be reasonably applied in the light of the manufacturing techniques used as well as for the production of electrolytic metallic manganese and manganese sulphate for compliance assessment.

Table No. 36: Comparison of the system with BAT – Non-ferrous metals industry

1. Environmental management systems	
BAT 1 parameter:	**In order to improve the overall environmental performance, BAT is to implement and maintain an environmental management system (EMS).**
Device parameter:	The Company has implemented planning, management and control procedures in accordance with the standards of the management management system, with an emphasis on operations management and control in accordance with the relevant standards. The system in place is not certified. Environmental values are summarized in a senior management statement.
BAT fulfillment:	BAT compliant
2. Energy management	
BAT 2 parameter:	**In order to use energy efficiently, BAT is to use a combination of techniques presented in the BAT conclusions.**
Device parameter:	Thermal energy for the process and heating of the buildings will be supplied in the form of superheated water from the Chvaletice power plant When dissolving metallic manganese in sulfuric acid, hydrogen gas will be formed. Hydrogen after purification will be used as a clean energy source for steam production. Steam will be used for drying of the final product and in the process of ammonia regeneration. For applications where the target heating temperature is lower than approx. 100oC *(e.g. leaching, manganese dissolution, hot water preparation and heating)*, superheated water (10 *bar, 130^{oC}*) will be used. The project will use hot water and steam for heating – it is expected that the equipment and lines will be suitably insulated to minimize heat loss.
BAT fulfillment:	BAT compliant
3. Process Control	
Parameter BAT 3:	**In order to improve the overall environmental performance, BAT is a stable workflow using a process control system together with a combination of the techniques below.** **a) Control and selection of input materials according to the process used and emission abatement techniques** **b) Good mixing of input materials to achieve optimal conversion efficiency and reduce emissions and defective products** **c) Charge weighing and measurement system**

	d) Processors for controlling the speed of material entry, for checking critical operating parameters and conditions including the alarm system, for controlling combustion conditions and additional gas supply **e) Online monitoring of furnace temperature, furnace pressure and gas flow** **f) Monitoring of critical operating parameters of equipment for reducing emissions to air such as gas temperature, reagent measurement, pressure drop, current and voltage ESP, flow and pH of washing liquids and gaseous components (e.g. O2, CO, VOC)** **g) Control of the dust and mercury content of exhaust gases before transport to sulphuric acid plants for installations producing sulphuric acid or liquid SO2.** **h) Online vibration monitoring to detect blockages and potential equipment failure** **i) Online monitoring of current, voltage and electrical contact temperatures in electrolytic processes** **j) Temperature monitoring and control in melting and smelting furnaces to protect against the formation of metal vapors and metal oxides due to overheating** **k) Processor for controlling reagent charge and wastewater treatment plant performance by monitoring temperature, turbidity, pH, conductivity and flow.**
Device parameter:	The project will use continuous monitoring and control of current, voltage and short circuit, which is part of the designed electrolysers.
BAT fulfillment:	BAT compliant
BAT 4 parameter:	**In order to reduce controlled emissions to air of dust and metals, BAT is to use a maintenance management system that focuses primarily on the performance of dust collection systems as part of an environmental management system (see BAT 1).**
Device parameter:	As part of the planned process- and system-specific maintenance procedures, dust collection systems will also be checked and checked at regular intervals – this will be part of the planned procedures within the established management system.
BAT fulfillment:	BAT compliant
4. Diffuse emissions	
BAT 5 parameter:	**In order to avoid or, where impracticable, reduce diffuse emissions to air and water, BAT is to capture diffuse emissions as close to the source as possible and to treat them.**
Device parameter:	Diffuse emissions into the air will be captured directly in the technological process at the source, when the emissions will be treated before discharge into the air (scrubbing, dust filters, etc.) and reused in the production process – see the Air chapter.
BAT fulfillment:	BAT compliant
Parameter BAT 6:	**In order to avoid or, where impracticable, reduce emissions of diffuse dust to air is to develop and implement an action plan for diffuse dust emissions as part of an environmental management system (see BAT 1), which includes both of the following measures:** **a. to identify the most important sources of diffuse dust emissions (e.g. by means of EN 15445);** **(b) identify and implement appropriate activities and techniques to avoid or reduce diffuse emissions within a given timeframe.**
Device parameter:	Emission sources of diffuse dust were identified during the design and subsequently evaluated in a separate study evaluating the impact of the project on air (Dispersion study), where the evaluation is based on dispersion model calculations, taking into account field characteristics and specific parameters of individual sources. As part of this separate assessment, the relevant measures for reducing emissions are also determined, see. Dispersion study.
BAT fulfillment:	BAT compliant

BAT 7 parameter:	**In order to avoid diffuse emissions from the storage of raw materials, BAT is to use a combination of the following techniques.** **a) Closed buildings or silos/bins for the storage of dust-forming materials** **b) Covered storage of dust-free materials such as concentrates, bulk materials, etc., containing water-soluble organic compounds** **c) Sealed packages of dust-forming or secondary materials containing water-soluble organic compounds** **d) Covered spaces for the storage of materials in the form of pellets or agglomerates** **e) Use of water and mist atomisers with or without additives (e.g. latex) for materials forming dust** **f) Dust/gas extraction devices located at transport and translation points for dust-forming materials** **g) Certified pressure vessels for the storage of chlorine gas or mixtures containing chlorine** **h) Materials for tank construction that are resistant to stored materials** **i) Reliable leak detection and level display systems with overfill alarm** **j) Storage of reactive materials in double-walled tanks or tanks located in chemically resistant sumps of the same volume and use of a storage area that is impermeable and resistant to stored material** **k) Design of storage facilities so that: — any leakage from tanks and transport systems is captured and stored in sumps capable of containing at least the volume of the largest storage tank in the sump; — transport points are placed in a pit that catches any material leaks** **l) Using an inert gas liner to store materials that react with air** **m) Capture and treatment of emissions from storage using an emission mitigation system designed to process stored compounds. Collection and treatment of water used for dust washing before discharge** **n) Regular cleaning of the storage area and, if necessary, moistening with water** **o) In the case of outdoor storage, the location of the longitudinal axis of the pile parallel to the prevailing wind direction** **p) In the case of outdoor storage, protective plantings, windbreaks or wind structures to reduce wind speed** **q) In the case of outdoor storage, where feasible, one pile instead of several** **r) Use of oil and fixed sewer collectors in open outdoor storage areas. Use of concrete surfaces that have curbs or other trapping devices to store material that may release oil, such as metal filings**
Device parameter:	Materials forming dust will be stored in closed silos/containers. All warehouses of raw materials are covered, outdoor storage of raw materials is not used. Manganese sulphate will be dispatched in sealed packages. It is not relevant for other materials. Due to the technology used (enclosed devices inside buildings) and the humidity of the materials, it is not necessary or appropriate to use water and mist atomizers. Dust/gas extraction is not considered in conveyors and translation points due to the very high humidity of the transported materials. For the construction of the tanks will be used materials that are resistant to the stored materials. For tanks where there is an increased risk, e.g. leakage, hazard of the stored substance, etc., a leak detection system and level display in tanks with an overfill alarm will be installed. The project envisages the placement of tanks for the storage of materials in chemically resistant reservoirs of the appropriate volume or in double-jacket tanks (diesel) The storage areas will be constructed in such a way that any leaks from the tanks will be collected in the collection pits, the size of the collection pits is designed according to valid standards. The design of the system will allow pumping leaks back into the process. The project envisages planting greenery, which will fulfil, among other things, a protective function (wind, dust, aesthetic aspect).

	Outdoor storage of material is not envisaged. All rainwater from the processing plant is used in the production process. Rainwater from the hardened areas of the quarry hinterland is discharged into the watercourse through the lapol.
BAT fulfillment:	BAT compliant
Parameter BAT 8:	**In order to avoid diffuse emissions from the handling and transport of raw materials, BAT is to use a combination of the techniques described below.** **a) Closed conveyors or pneumatic systems** **b) Covered conveyors for handling** **c) Dust extraction from traffic points, silo fans, pneumatic conveying systems** **d) Sealed bags or drums for handling materials with dispersion or water-soluble components** **e) Suitable tanks for handling materials in the form of pellets** **f) Spraying for moistening materials at handling points** **g) Minimizing traffic distances** **h) Limiting the height of impact of belt conveyors, mechanical shovels and grabs** **i) Speed adjustment of open conveyor belts** **j) Minimizing descent speed or free-fall altitude** **k) Placement of conveyors and pipes in safe open spaces above ground** **l) Automatic impermeable closure of transport links for handling liquids** **m) Evacuation of released gases to a VOC control van** **n) Washing of wheels and chassis of vehicles used for the delivery or handling of dusty materials** **o) Using scheduled operations for road sweeping** **p) Separation of incompatible materials** **q) Minimize material movement between processes**
Device parameter:	Within the project, such technology and technological procedures are designed and will be used that will allow to reduce or completely eliminate diffuse emissions from the handling and transport of raw materials. The mined material has a moisture content of 21%, so dust emissions from this activity will be negligible, see Dispersion study. In the background of the quarry there will be a facility for washing the wheels of mining machinery. Within the mining area, sprinkling vehicles on solid surfaces will be used to eliminate dust emissions. The transport of material (suspension) between the quarry area and the processing plant will take place by means of conveyors located in a closed technological bridge. All equipment and areas where dust emissions will be generated will be extracted using appropriate filters to capture dust emissions. The bulk of technological operations will be carried out in solution.
BAT fulfillment:	BAT compliant
BAT parameter 9:	**In order to avoid or, where impracticable, reduce diffuse emissions from metal production BAT is to optimise the efficiency of waste gas capture and treatment by combining the techniques described below.** **a) Thermal or mechanical pre-treatment of secondary raw material to minimize organic contamination of the furnace charge** **b) Use of a closed furnace with a properly designed dedusting system or furnace seal and other processing units with an adequate ventilation system** **c) Use of secondary inlet for furnace operations such as loading and tapping** **d) Dust or vapour collection during the transport of dusty material (e.g. charging and tapping points, covered casting troughs)** **e) Optimisation of the design and operation of the hatch and piping for collecting vapours from the filling hole and from the tapping of molten metal, mattes or slag and transport in covered casting troughs** **f) Furnace/reactor closures such as house in house or pre-furnace for tapping and charging operations** **g) Optimization of the flue gas flow from the furnace using computer studies and liquid dynamics indicators**

	h) Loading systems of semi-closed furnaces for adding small quantities of raw materials **i) Treatment of captured emissions by an adequate abatement system**
Device parameter:	It is not relevant to the project under consideration.
BAT fulfillment:	-
5. Monitoring of emissions into air	
• **BAT parameter 10:**	• **BAT is to monitor chimney emissions to air at least at the frequency specified in the BAT conclusions — non-ferrous metals and in accordance with EN standards. In the absence of EN standards, BAT is to use ISO, national or other international standards that guarantee the provision of data of equivalent scientific quality.**
• **Device parameter:**	• Emissions discharged into the air will be monitored in accordance with the relevant legislative regulations and standards and according to the conditions of the Integrated Permit, which will be issued in the next phases of the project.
• BAT fulfillment:	• BAT compliant
6. Mercury emissions	
BAT parameter 11:	**In order to reduce mercury emissions to air from the pyrometallurgical process (other emissions to be sent to a sulphuric acid plant), BAT is to use one or both of the techniques listed below.** **a) Use of raw materials with a low mercury content, including cooperation with suppliers to remove mercury from secondary materials.** **b) Use of adsorbents (e.g. activated carbon, selenium) in combination with dust filtering.**
Device parameter:	Not relevant – mercury-containing materials will not be used in the technology.
BAT fulfillment:	-
7. Sulphur dioxide emissions	
BAT parameter 12:	**In order to reduce SO2 emissions from waste gases with a high SO2 content and to avoid waste generation from the flue gas cleaning system, BAT is sulphur recovery by producing sulphuric acid or liquid SO2.**
Device parameter:	Not relevant – the technology will not produce SO2 emissions.
BAT fulfillment:	-
8. NOX emissions	
BAT 13 parameter:	**In order to exclude NOX emissions to air from the pyrometallurgical process, BAT is to use one of the following techniques:** **a) Low NOX burners** **b) Oxygen burners** **c) Flue gas recirculation (back by a burner to reduce the flame temperature) in the case of oxygen burners.**
Device parameter:	Not relevant, there is no pyrometallurgical process within the process.
BAT fulfillment:	-
9. Emissions to water, including monitoring	
Parameter BAT 14:	**In order to avoid or reduce the generation of wastewater, BAT is to use one or a combination of the techniques listed below.**

	a) Measurement of the amount of clean water used and the amount of wastewater discharged **b) Reuse of wastewater from treatment operations (including rinsing anode and cathode water) and leakages in the same process** **c) New use of weak acid flows in wet ESP and wet scrubbers** **d) New use of wastewater from slag granulation** **e) New use of surface runoff water** **f) Using a closed-loop cooling system** g) **New use of treated water from wastewater treatment plants**
Device parameter:	The whole project is designed with maximum emphasis on efficient water use – the use of wastewater from the Chvaletice power plant, closed water cycles, where all water is recycled and reused in the process. Mine water and polluted rainwater will also be used within the technological process – for details, see the Water chapter. The expected amount of wastewater is about 4% of the water at the inlet.
BAT fulfillment:	BAT compliant
Parameter BAT 15:	**In order to avoid water contamination and reduce emissions to water, BAT is to separate uncontaminated wastewater streams from wastewater streams requiring treatment.**
Device parameter:	Within the project there are several separate water streams, including separate wastewater streams – see the chapter Water.
BAT fulfillment:	BAT compliant
Parameter BAT 16:	**BAT is to use ISO 5667 for water sampling and monitoring of emissions to water at the point where emissions leave the installation, at least once a month (1) and in accordance with EN standards. In the absence of EN standards, BAT is to use ISO, national or other international standards that guarantee the provision of data of equivalent scientific quality.**
Device parameter:	Discharge wastewater and selected pollutants will be monitored at the outlet of the wastewater treatment plant in accordance with the relevant permit and applicable standards.
BAT fulfillment:	BAT compliant
Parameter BAT 17:	**In order to reduce emissions to water, BAT is to clean up leakages from the storage of liquids and wastewater from the production of non-ferrous metals, including the washing phase in the rotary (Waelz) furnace process, and to remove metals and sulphates by combining the following techniques** **a) Chemical precipitation** **b) Sedimentation** **c) Filtration** **d) Flotation** **e) Ultrafiltration** **f) Activated carbon filtration** **g) Reverse osmosis**

Úrovně emisí související s nejlepšími dostupnými technikami pro přímé emise do vodního recipientu z výroby mědi, olova, cínu, zinku (včetně odpadní vody z prací fáze v procesu Waelzovy pece), kadmia, vzácných kovů, niklu, kobaltu a feroslitin

BAT-AEL (mg/l) (denní průměr)

Parametr	Výroba					
	Měď	Olovo a/nebo cín	Zinek a/nebo kadmium	Vzácné kovy	Nikl a/nebo kobalt	Feroslitiny
Stříbro (Ag)	NR			≤ 0,6	NR	
Arsen (As)	≤ 0,1 (1)	≤ 0,1	≤ 0,1	≤ 0,1	≤ 0,3	≤ 0,1
Kadmium (Cd)	0,02–0,1	≤ 0,1	≤ 0,1	≤ 0,05	≤ 0,1	≤ 0,05
Kobalt (Co)	NR	≤ 0,1	NR		0,1–0,5	NR
Chrom celkem (Cr)	NR					≤ 0,2
Chrom (VI) (Cr(VI))	NR					≤ 0,05
Měď (Cu)	0,05–0,5	≤ 0,2	≤ 0,1	≤ 0,3	≤ 0,5	≤ 0,5
Rtuť (Hg)	0,005–0,02	≤ 0,05	≤ 0,05	≤ 0,05	≤ 0,05	≤ 0,05
Nikl (Ni)	≤ 0,5	≤ 0,5	≤ 0,1	≤ 0,5	≤ 2	≤ 2
Olovo (Pb)	≤ 0,5	≤ 0,5	≤ 0,2	≤ 0,5	≤ 0,5	≤ 0,2
Zinek (Zn)	≤ 1	≤ 1	≤ 1	≤ 0,4	≤ 1	≤ 1

NR: Není relevantní
(1) V případě vysokého obsahu arsenu v celkovém vstupu do provozu může být hodnota BAT-AEL až 0,2 mg/l.

Device parameter:

Leaks from liquid storage will be collected in collection trays and pumped back into the process.
Wastewater will be treated using the above techniques (a), b), c)

The emission levels associated with the best available techniques for direct emissions to a receiving water from the metal production listed in the BREF do not include parameters for the production of non-ferrous metals/production of manganese (manganese) and manganese sulphate (manganese sulphate). For this reason, the parameters of wastewater discharged into the watercourse were compared with the strictest values listed as BAT17.

Pointer	**Unit**	**Expected concentrations of pollutants**	**BAT conclusions — Non-Ferrous Metals Processing (mg/l)**
As	mg/l	<0.02	≤ 0.1
Ca	mg/l	<400	
With	mg/l	<0.04	0,3
Fe	mg/l	<0.8	
Mg	mg/l	<60	
Mn	mg/l	<0.45	
On	mg/l	<150	

	Pb	mg/l	<0.002	≤ 0,2
	Zn	mg/l	<0.25	≤ 0,4
	Hydrocarbons such as C10-C40	mg/l	<0.1	
	Cl	mg/l	<150	
	Ph	-	6.5-7.5	
	SO4	mg/l	<350	
	CHSK-Cr	mg/l	<100	
	BSK5	mg/l	<30	
	NL	mg/l	<30	
	NH4	mg/l	<20	
	Ncelk	mg/l	<40	
	Total	mg/l	<2	
BAT fulfillment:	BAT compliant			

10. Noise	
Parameter BAT 18:	**In order to reduce noise emissions, BAT is to use one or a combination of the techniques listed below** **a) Use of mounds to shield the noise source** **b) Enclosing noisy plants or components in sound-absorbing structures** **c) Use of anti-vibration supports and connections for devices** **d) Orientation of noise emitting machinery** **e) Change the sound frequency**
Device parameter:	Noise reduction measures are designed based on the results of the Noise Study and are incorporated into the overall design of the project. For details, see Noise study and chapter Noise in the EIA documentation. a) Use of mounds – not relevant b) Closure of noisy operations – priority placement of equipment with a higher noise level on the ground floors, covering or other appropriate noise minimisation measures c) Use of anti-vibration supports – not relevant d) Orientation of noise emitting machinery — the location of equipment within buildings takes into account the noise situation. Taken into account in the Noise Study. e) Change in noise frequency – not relevant
BAT fulfillment:	BAT compliant
11. Stench	
Parameter BAT 19:	**In order to reduce odour emissions, BAT is to use one or a combination of the techniques listed below** **a) Suitable storage and handling of odorous materials** **b) Minimizing the use of odorous materials** **c) Careful design, operation and maintenance of all equipment that could be sources of odour emissions** d) **Afterburner or filtration techniques, including biofilters**
Device parameter:	Ammonia water tanks will be ventilated to the process pipe leading to the wet scrubbing, gases from production processes where ammonia/ammonia can be produced will be cleaned by passing through wet acid scrubbing.
BAT fulfillment:	BAT compliant

12. Selected BAT whose applicability is applicable to the project under assessment – THIS IS A BAT FOR SPECIFIC ACTIVITIES SUCH AS: PRODUCTION OF COPPER, ZINC, PRECIOUS METALS – HOWEVER, AS THE PRODUCTION OF MANGANESE IS NOT SPECIFICALLY REPORTED, BATS WERE IDENTIFIED IN PROPORTION TO THE TECHNIQUES USED IN THE PROJECT UNDER ASSESSMENT AND A COMPLIANCE ASSESSMENT WAS CARRIED OUT	
BAT 23 parameter:	**BAT for copper production - BAT for efficient energy use in electrorefining and electrolytic metal production is to use a combination of the following techniques** **a) Use of insulation and covers of electrolytic tanks** **b) Adding surfactants to electrolytic cells** **c) Improved cell design for lower power consumption** **d) Using stainless steel cathode plates** **e) Automatic cathode/anode changes for precise electrode placement in the cell** f) **Short circuit detection and quality control to ensure that the electrodes are straight and flat and that the anode has an accurate mass**
Device parameter:	Improved cell construction for lower energy consumption will be used in the design, stainless steel cathode plates will be used. Anodes will be replaced automatically. Short circuit detection and electrode quality control will also be used.
BAT fulfillment:	BAT compliant
BAT 50 parameter:	**BAT for copper production — In order to reduce acid vapour emissions to air from electrolytic cells, electrolytic refining cells, cathode stripping machine washing chambers and anode waste washing machines, BAT is to use a wet scrubber or a droplet separator.**
Device parameter:	Within the assessed project, sulfuric acid aerosol will be produced during leaching and dissolution of metallic manganese. In both cases, the reaction mixture produces a gas (leaching – CO2, dissolving Mn – hydrogen), which can pull down droplets of a solution containing sulfuric acid. A large part of the droplets is already captured at the outlet of the reactor in the demister/cooler, the remaining amount is further reduced in the gas scrubber. Water will be used as the washing liquid. The spent washing liquid will be used in the production process.
BAT fulfillment:	BAT compliant
Parameter BAT 111:	**BAT for the production of zinc/a or cadmium** **In order to reduce diffuse emissions from leaching, separation of solids and liquids and air purification, BAT is to use one or a combination of the techniques listed below.** **a) Covering the tanks with a lid** **b) Inlet and outlet channel covers for process fluids** **c) Connection of tanks with a central mechanical abatement system or with a separate emission abatement system tank** **d) Covering vacuum filters with lids and connecting them to the abatement system**
Device parameter:	Sulphuric acid will be used to dissolve manganese-containing minerals as part of the leaching process. Dissolution will take place in closed mixed tanks. Dissolving will produce carbon dioxide gas (CO2), which will be used in downstream production stages to extract/precipitate manganese from the process of washing the puddle and from the process of Mg removal. The CO 2 leaching process off-gases will be cooled and washed out with water before further use to remove trace amounts of acid and solid particles. The resulting condensate and used washing solution will be returned to the main water tank for the acid leaching circuit.
BAT fulfillment:	BAT compliant
BAT parameter 114:	**BAT for the production of zinc/a or cadmium** **In order to reduce emissions to air of zinc and sulphuric acid from leaching, cleaning and electrowinnig and to limit emissions of arsenic and stiban from cleaning, BAT is to use one or a combination of the techniques listed below** **a) Wet scrubber** **b) Droplet separator** c) **Centrifuge system**

<table>
<tr><td>Device parameter:</td><td>
Within the assessed project, the process of leaching and electrowinnig is part of the technology. There are no emissions of arsenic or stiban.
Emissions from the leaching process will be captured, a large part of the droplets will be captured at the outlet of the reactor in the demister/cooler unit, the remaining amount will then be captured in the scrubber.

During the electrowinnig process, various gases (hydrogen, oxygen, ammonia, water vapor) will be formed. In order to protect the environment and the health of workers, electrolytic cells with side exhaust ventilation will be used. The gas from each electrolyser will be sucked separately by four fans into four scrubbers, where the gas will be cleaned of ammonia and aerosol of the electrolytic solution. The solution from the gas scrubbers will be processed in the ammonia recovery circuit. The purified exhaust gas will be discharged into two chimneys and discharged into the atmosphere (B-27-V). For details, see Description of the project.

BAT-associated emission levels for emissions to air of zinc and sulphuric acid from leaching, purification and electrowinnig

<table>
<tr><td>Parameter</td><td>BAT-AEL (mg/Nm3)</td><td>Project emissions (mg/Nm3)</td></tr>
<tr><td>Zn</td><td>≤ 1</td><td>does not arise</td></tr>
<tr><td>H2SO4</td><td>< 10</td><td>0,2</td></tr>
</table>
</td></tr>
<tr><td>BAT fulfillment:</td><td>BAT compliant</td></tr>
<tr><td>Parameter BAT 137:</td><td>
BAT for the production of precious metals
In order to reduce diffuse emissions from the hydrometallurgical operation, BAT is to use all of the techniques listed below.
a) Protective measures such as sealed or closed reaction vessels, storage tanks, solvent extraction installations and filters, vessels and tanks equipped with level monitoring, closed pipes, sealed sewer systems and scheduled maintenance programmes
b) Reaction vessels and tanks connected to a common piping system where the waste gas is extracted (automatic standby/back-up unit in case of failure)
</td></tr>
<tr><td>Device parameter:</td><td>The measures used in the process are listed in the description of the project and the description of the production process – it corresponds to (a). (b) is not relevant</td></tr>
<tr><td>BAT fulfillment:</td><td>BAT compliant</td></tr>
<tr><td>BAT 140 parameter:</td><td>
BAT for the production of precious metals
In order to reduce dust and metal emissions to air from all dusty operations such as crushing, sieving, mixing, melting, smelting, smelting, incineration, calcination, drying and refining, BAT is to use one of the following techniques
a) Bag filter
b) Wet scrubber in conjunction with ESP, allowing selenium recovery
</td></tr>
<tr><td>Device parameter:</td><td>
Hose filters with a pulse-jet cleaning system will be installed on the technological vents containing solid pollutants, which ensures continuous operation of the filter without loss of its efficiency.
In some technological steps, an outgas containing aerosol or gaseous substances is produced, the content of these substances in the degassing is reduced by wet gas scrubbing.

BAT-associated emission levels for dust emissions to air from all dust-based operations

<table>
<tr><td>Parameter</td><td>BAT-AEL (mg/Nm3)</td><td>Project emissions (mg/Nm3)</td></tr>
<tr><td>Dust</td><td>2 - 5</td><td>0,1 - 1
5 (activated carbon cleaning)</td></tr>
</table>
</td></tr>
</table>

BAT fulfillment:	BAT compliant
Parameter BAT 145:	**BAT for the production of precious metals** **In order to reduce emissions of NH3 to air from a hydrometallurgical operation using ammonia or ammonium chloride, BAT is to use a wet scrubber with sulphuric acid.**
Device parameter:	NH3 emissions will be generated in the process in the following technological steps – electrowinnig, iron leaching and removal, Mg removal, ammonia recovery – emissions from these process steps will be cleaned in a scrubber to gases, where the washing liquid will be sulfuric acid. Ammonium chloride is not formed in the process. BAT-associated emission levels for emissions to air of NH3 from a hydrometallurgical operation using ammonia or ammonium chloride: Parameter: NH3; BAT-AEL (mg/Nm3): 1 - 3; Project emissions (mg/Nm3): 0,1 - 1,5
BAT fulfillment:	BAT compliant

Parameter	BAT-AEL (mg/Nm3)	Project emissions (mg/Nm3)
NH3	1 - 3	0,1 - 1,5

8. *Expected date of commencement of the implementation of the plan and its completion*

Expected date of commencement of preparatory and fieldwork in the area of the processing plant: 2023

Expected date of commencement of construction of siding: 2024

Expected date of commencement of construction of the processing plant: 2025

Expected date of commencement of construction of quarry facilities: 2025

Expected date of commencement of operation of the processing plant: 2028

Expected date of commencement of extraction and disposal of mining waste: 2028

Expected date of completion of mining and dumping of mining waste: 2053

The total duration of the project, including the completion of remediation and reclamation, the provision of planted crops and the handover of the land to other entities for use, can be estimated at 30 years from the start of mining. The expected completion date of the project is therefore approximately in 2058.

9. *List of territorial self-governing units concerned*

Region: Pardubice Region (NUTS3 region code: CZ053)

Municipality: Chvaletice (CSO municipality code: 575071; MMR municipality code: 165697)

Trnávka (CSO municipality code: 530794; MMR municipality code: 144797)

10. *List of follow-up decisions pursuant to § 9a para. 3 and the administrative authorities that will issue such decisions*

Follow-up proceedings within the meaning of § 9a para. 3 point. (g) the laws in which the follow-up decisions will be issued are:

- Point 1. Zoning procedure
- Item 2. Construction procedure
- Point 6. Mining permit procedure
- Point 7. Procedure for determining the mining area
- point 10. Procedure for issuing an integrated permit,
- Point 11. Procedure for issuing a stationary source operating permit.
- item 12. the procedure for issuing a consent to the operation of facilities for the use, disposal, collection or purchase of waste, IPPC

In the anticipated wording of Act No. 100/2001 Coll. from 1 July 2023, points 1 and 2 will be replaced by a new point 1:

- point 1. proceedings on the development permit pursuant to the Building Act, unless proceedings on the development permit with an impact assessment are conducted,

Table No. 37: List of successive decisions

Decision	Legislation	Competent administrative authority
Decision on the determination of the mining area	44/1988 Coll. §27	District Mining Authority for the Hradec Králové and Pardubice Regions
Decision on the permit of mining activities	61/1988 Coll. §17	District Mining Authority for the Hradec Králové and Pardubice Regions
Zoning decision on the location of the building* Zoning decision on land use change*	185/2006 Coll. §79	Municipal Office of Přelouč
Building permit*	185/2006 Coll. §115	Municipal Office of Přelouč
Decision on development consent*	283/2021 Coll. Part Six	Municipal Office Přelouč / Regional Authority of the Pardubice Region
Decision on the integrated permit	201/2012 Coll. §13 (§19a)	Regional Authority of the Pardubice Region
Decision on issuing a permit for the operation of a stationary source of air pollution (for mining)	201/2012 Coll. §11	Regional Authority of the Pardubice Region

* *Depending on the applicable legislation at the time of the project permit*

II. INPUT DATA

1. *Soil (e.g. species, protection class, size of occupation)*

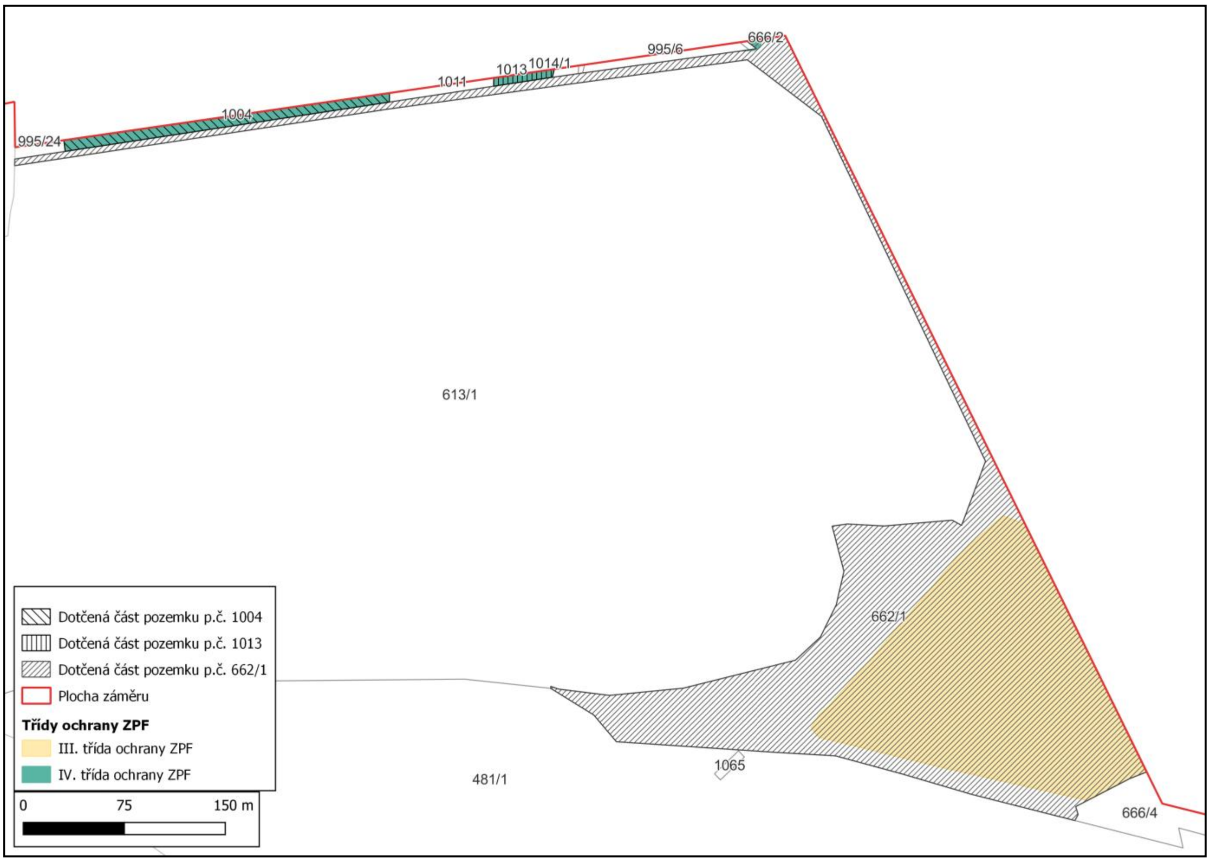
Mining area

The area concerned by the DP determination is ***119.3475 ha*** *and****,*** according to land data from the land register, almost entirely lies outside the agricultural land fund (ZPF) and outside the land designated for forest functions (PUPFL).

Only at the northern edge and in the eastern part does the mining area encroach on the ZPF lands. These are specifically plots No. 1004, 1013 and 662/1 in the cadastral register. Trnávka (see Picture no. 39), the area concerned is approximately 5.58 ha. Administratively, therefore, the mining area on the ZPF land will be defined. In order to implement the plan, it will be necessary to apply to the ZPF protection authority for approval of the proposal to determine the DT for the ZPF area of approximately 5.58 ha.

In the area of the DT there is BPEJ 3.19.11, which is included in the III. class of protection according to Decree No. 48/2011 Coll., on the determination of classes of protection and BPEJ 3.55.00, which is included in the IV. class of protection.

Picture no. 39: ZPF plots in the area of DP Trnávka – north-eastern part of DP



Physical intervention within the implementation of the plan will occur in the case of plot No. 662/1 in the Trnávka cadastre. This land will be used for the construction of a tailings. On the plot area, the area will be prepared before the actual opening of the deposit and mining waste will be deposited in an isolated repository in the initial phase. The area will thus become part of the future mining waste repository. No other solution is technically possible, because in the initial phase of implementation, the current tailings will not yet be available for the disposal of mining waste. The intention will thus lead to the permanent occupation of practically the entire part of plot No. 662/1 lying in the proposed DP, i.e. 5.37 ha. However, only a part of this area is covered with topsoil and is farmed. It is a part with an area of 2.77 ha, where BPEJ 3.19.11 is defined, classified as III. class of protection. The remaining part of the land in question lies under the current tailings and is therefore permanently unusable for agricultural purposes, even though it is protected as a ZPF.

Given that the plot No. 662/1 in the cadastral register. Trnávka is registered in the land register as an agricultural land fund (ZPF), it will be necessary to permanently remove the affected part of the land from the ZPF before mining activities are permitted.

Topsoil and any subsoil from this area will be hidden separately and deposited in the depot in the peripheral part of this area or in the deposit west of the MGL. The intention of the investor is to use topsoil and subsoil for reclamation work. This intention requires the approval of the ZPF protection authority.

The project will not affect forest land protected as forest functions (PUPFL).

Territory of the processing plant

The processing plant is designed on an area of 27.89 ha in the Chvaletice industrial zone. All land within the territory of the proposed processing plant is registered in the CN as type of land, other area or built-up area. The land in question is not part of the Agricultural Land Fund (ZPF) and is not intended to fulfil the PUPFL forest function. The intention will not affect the ZPF or the PUPFL.

2. *Water (e.g. water source, consumption)*

The water will be used for drinking, hygienic and technological purposes.

Water sources

Drinking water sources

- public water mains

Industrial water sources

Industrial (process) water will be taken from several sources listed below:

- captured mine water from the area of mining and reclamation,
- captured rainwater from the area of extraction and reclamation,
- collected rainwater from paved areas in the area of the technical background of the quarry,
- water from the Chvaletice power plant – blowing from cooling towers,
- process water from the Chvaletice power plant – feed water,
- collected rainwater from paved and handling areas in the area of the processing plant (roads, handling areas and other paved surfaces),

- collected clean rainwater from the area of the processing plant (roofs, green areas, etc.).

Contrary to the data stated in the notification of the intention, groundwater abstraction from 2 newly built wells located at the north-eastern border of the DP is no longer planned. Thus, no groundwater will be used.

The rainwater balance is given in Chapter B.III.2.

Process water taken from mining and reclamation areas in the mining area will be mine water. According to Section 40(1) of the Mining Act, mine water is all groundwater, surface water and precipitation water that has entered underground or surface mining areas, regardless of how it entered them. According to paragraph (2)(a) of the latter provision, an organisation is entitled to use mine water for its own use free of charge during mining activities. Similarly, according to Section 8(3)(f) of the Water Act, a water management permit is not required for the use of mine water by an organisation in mining activities for its own use or for the discharge of mine water by an organisation.

Fire water sources/hydrant circuit

- the source of fire water of the project will be a connection to the fire water circuit of the Chvaletice power plant and KASI FOUNDRY a.s. (this connection already exists at present; the existing system will be modified).

The overall water management scheme is shown in the following picture (Picture no. 40).

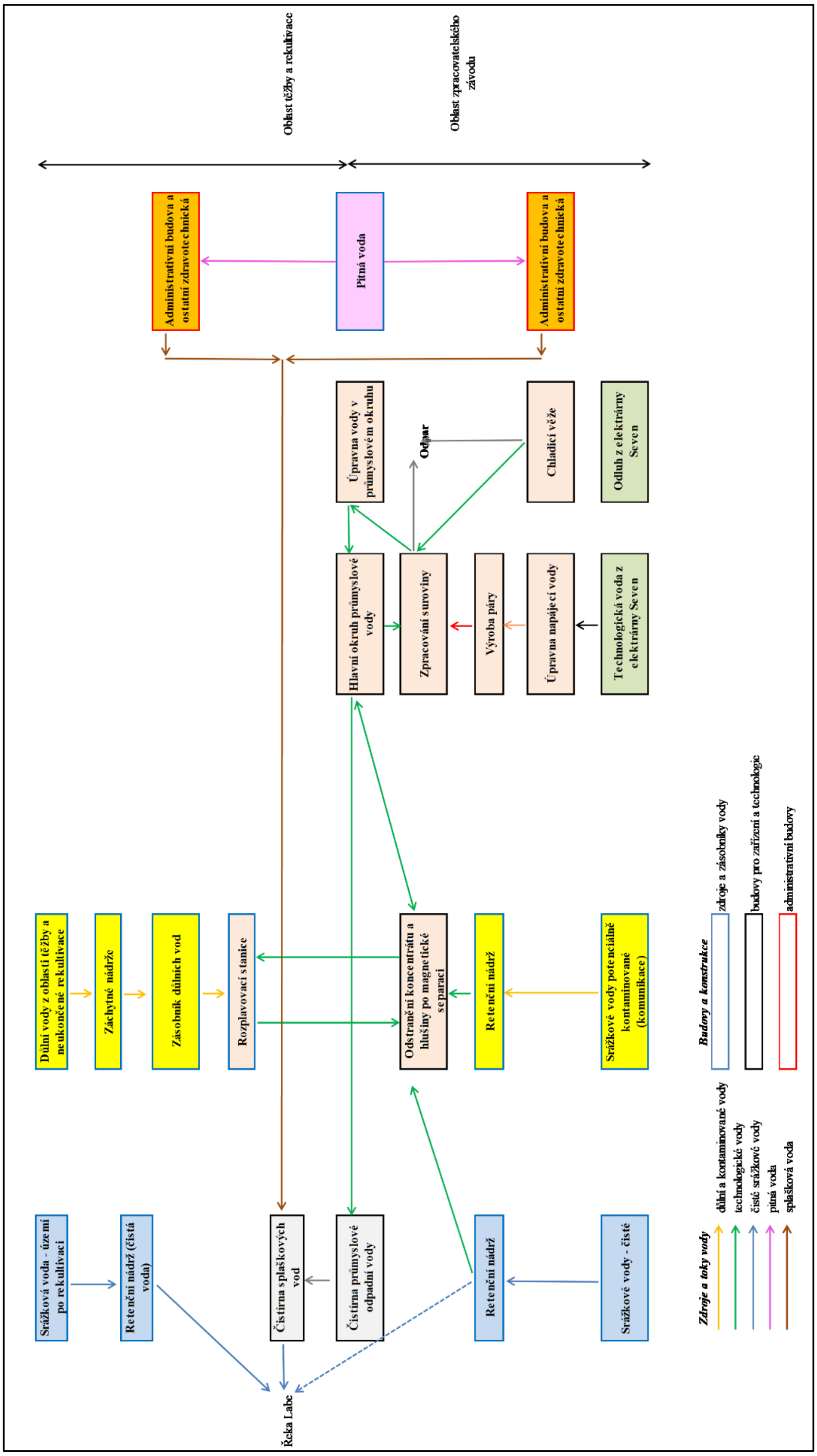
Drinking water and water for social purposes

Drinking water will be used for hygienic, sanitary and other needs of employees. The consumption of drinking water for social purposes is calculated in accordance with Decree 120/2011 Coll., par. VII 'Establishments', item 46. With the maximum number of 435 employees (together for the processing plant and the mining part of the plant), the consumption of drinking water is about 15,225 m3 / year.

Most of the buildings in both parts of the complex (processing part, part of mining) will be connected to the drinking water supply for sanitary equipment. These buildings will also be connected to the sewage system.

The buildings will be supplied with drinking water by the area drinking water supply, which will be connected to the public water mains. Drinking water will not be used for technological purposes.

Picture no. 40: Water management scheme



Industrial water

Mining part

Captured mine water from the area of mining and reclamation

In the area of raw material extraction, mine water will be generated. Mine water will be collected in local reservoirs, from there it will be drained into a retention reservoir and from there the water will be pumped to a pulping station, where it will be used to mix with the raw material.

The amount of mine water will be approximately constant throughout the lifetime of the project (the size of the excavated area will change minimally), it will be significantly dependent mainly on the nature and intensity of precipitation. With an average wet year, mine water formation is expected to be 42 m3/day (see Table No. 39).

Captured rainwater from the area of mining and reclamation

Clean rainwater will be generated in the areas of the repository where reclamation has been completed. This water will not be used in the technological process, it will be collected in a retention tank in the center of the repository and from there it will be discharged in a controlled manner into the Elbe (limitation of peak water flow).

Clean rainwater will begin to be generated approximately 3 years after the start of activities (after the reclamation of the first part of the repository) and its amount will gradually increase with the increasing area of the reclaimed repository.

Captured rainwater from paved areas in the area of the technical background of the mining area

Rainwater from roads and handling areas of the quarry hinterland, which can potentially be contaminated, will be collected in a collection pit (about 20 m3) and from there pumped into the mine water storage tank (next to the building of the pulping unit) and together with the mine water processed in the pulping unit.

In the technological process, water will be used in three ways:

1. for the leaching of raw material and its transport to the processing plant (object B01),
2. for washing mobile mechanisms (object J),
3. for anti-dust/sprinkling measures.

The extracted raw material has an average humidity of about 21%, the deposited mining waste about 18 - 20%. Extraction and storage of material takes place 5 days a week, which does not allow the material to dry. In the area of mining and storage, significant dust levels can therefore only be considered during periods of prolonged drought in windy weather. The actual handling of the material with natural high humidity will be practically dust-free. Sprinkling will be carried out mainly on roads where the surface dries quickly and the movement of the technique can cause swirling dust.

Water consumption for anti-dust measures in the mining area can be estimated with a reserve at 10 m3 per day, i.e. 300 m3 per month, and only for the dry and warm months. In the other period, water consumption for anti-dust measures will be significantly lower.

Processing plant

Water from the Chvaletice Power Plant – bleeding from cooling towers

Bleeding water from the Chvaletice power plant will be the main source of technological water. The bleeding water is currently being discharged into the Elbe. The planned amount of bleeding water for technological purposes is significantly lower than the amount produced by the Chvalatice power plant (about 16-30% of the produced amount).

The amount of used bleeding water will fluctuate in the range of approximately 1,209 - 2,170 m3/day. Such a wide range of bleeding water consumption is given by the fact that the amount of bleeding water will be compensated by fluctuations in the amount of incoming water from sources that are affected by precipitation activities and their amount is therefore highly variable (*mine water, rainwater used, raw material moisture*).

Water from the Chvaletice power plant will be supplied to the processing plant through a pipe installed on a technological bridge over a purpose-built road in the northeastern part of the site.

<u>Process water from the Chvaletice Power Plant – feed water</u>

Process water is treated water from the Chvaletice power plant suitable for feeding steam boilers and subsequently for steam production. The amount of this water will be 696 m3/day. Process water can be temporarily replaced by bleeding water. Process water will be supplied to the processing plant from the power plant's process water system through a pipeline running parallel to the bleeding water pipeline.

<u>Collected rainwater from paved and handling areas in the area of the processing plant</u>

These are rainwater from roads and handling areas that can potentially be contaminated, will be collected separately from clean rainwater in the retention tank (tank capacity 10,660 m3) and will also be used as industrial water.

In case of emergencies, this water will be drained to a wastewater treatment plant and after its treatment it will be subsequently discharged into the Elbe.

<u>Collected clean rainwater from the processing plant area</u>

The processing plant will also generate clean rainwater (*green areas, roofs, etc.*). This water will be collected separately from rainwater from roads and handling areas in a separate retention tank (tank capacity 3,220 m3).

Rainwater from paved areas will normally be used as a source of industrial water. Rainwater from unpaved, green areas such as lawns, etc. will be infiltrated. In extreme rainfall, water will be drained from this reservoir through an existing pipeline that runs under road 322 and the railway corridor and leads into an open concrete channel that runs in parallel with the railway and the road on the south side of the tailings. In the end part, the riverbed is piped and leads into the Elbe at the port of Chvaletice.

The water management system of the processing plant is quite complex. The basis of the system is the main circuit of industrial water, in which a water treatment plant is included that maintains a stable quality/composition of water in this circuit. The treatment plant is not described in more detail because it is a part of the technological circuit and no wastewater leaves the treatment plant (only sludge, which is mentioned in the chapter Waste). Part of the main water circuit is also a water storage tank, which serves to balance the required amount of water in this circuit.

In addition to the main water circuit, there are several secondary water circuits in the system that are connected to the main circuit and take water from it or return it back (e.g. water formed during the dewatering of the filter cake, bleeding water from cooling towers, or condensate from the ventilation of reactors). Secondary water circuits are often interconnected so that water leaving one stage (e.g. filter presses) is still used in a production step where the quality/stability of service water is not essential (e.g. leaching of concentrate before leaching). This arrangement allows for better use of water and also for a reduction in the capacity of the water treatment plant in the industrial water circuit.

In addition to the secondary circuits of water connected directly to the main circuit, there are also:

Water circuits of cooling towers – fresh water is replenished to this circuit directly from the water supply pipe from the Chvaletice power plant. Bleeding water from the cooling towers leads into the main water circuit.

Water circuit of gas scrubbing – fresh water is replenished from the main water circuit, spent solution (weak sulfuric acid, ammonium sulphate solution) is reused in the production process (leaching, ammonia regeneration).

Steam and condensate circuit (steam production and utilization) – condensate is returned as feed water, blow-off from boilers is fed into the main water circuit.

The condensate circuit from the evaporator of the manganese sulphate solution – the condensate is returned to the manganese metal dissolution production step.

Condensates formed by cooling of exhaust gases in pipeline systems are mostly returned to the production stage where they originated (given by the slope of the pipes), in rare cases to the main water circuit.

Main areas of industrial water consumption and major technological hubs

Pulping station (B01)

It is a facility located in the mining area. In this building, the raw material is pulped to form a slurry, which is pumped through the technological bridge to the processing plant to the magnetic separation step (objects B04, B02). Mine water from the area of mining and reclamation, rainwater captured in the area of the mining area and water returned from the dewatering of the concentrate and the non-magnetic fraction after passing through the magnetic separator will be preferably used for pulping. If the aforementioned streams prove inadequate, the deficient water volume will be replenished from the primary water circuit.

Magnetic separation (B02)

It is an object located in the processing plant area. In this process, the magnetic concentrate and the non-magnetic fraction (tailings) are divided. The separation process takes place in a relatively diluted suspension – the slurry prepared in the pulping unit must be further diluted. For this, water from the filtration of magnetic separation products is used (see next paragraph), so the water circulates.

Dewatering of magnetic separation products (B34, B04, B03)

These are objects located in the main area.

The product of magnetic separation consists of 2 flows of suspended material – concentrate suspension and tailings suspension. Both of these streams will be drained (filter presses) and the obtained water will be returned partly to the magnetic separation circuit and partly to the pulping unit.

Cooling towers (B26, B28)

In the processing plant, there are 2 cooling towers (open system) installed. One of them serves exclusively for the electrowinnig unit, and the other for the rest of the plant. In cooling towers, water is lost through evaporation. A larger part of the bleeding water from the cooling towers is drained into the main circuit of industrial water, a small part is then (after treatment in the industrial wastewater treatment plant) discharged into the watercourse as wastewater. These are objects located in the main area.

Gas scrubbing (B05, B27, B08, B10)

These are objects located in the main area. The plant is equipped with 6 degassing machines. Water is lost in the washing towers. Water loss in the scrubbing circuit is replenished from the main water circuit. The exhausted absorption liquids from scrubbing are used in the production process.

Technological circuit for obtaining manganese metal and manganese sulphate monohydrate

It is a set of objects and technological units in which the raw material is processed to form pure manganese metal and pure manganese sulphate monohydrate. The objects and technological units constitute the technological circuit for processing raw materials. Apart from the final steps—drying of metal manganese and drying of manganese sulfate monohydrate—the entire technological process occurs through wet methods, such as suspension and solution. Water from the water circuit is added to the individual steps of the production process as needed, and the excess water is then returned to the main circuit.

In addition to the above, other circuits with greater water consumption are:

- concentrate leaching,
- washing the filter cake after leaching,
- washing filter cakes arising from purification of manganese sulphate solutions,
- the process of recovering manganese and removing magnesium from the spent anolyte,
- The process of recovering manganese from washing solutions for the leach residue
- dissolution of metallic manganese
- evaporation and crystallization of manganese sulphate
- ammonia recovery process
- preparation of reagents (e.g. preparation of hydrated lime, dilution of sulphuric acid),
- auxiliary processes (washing sails, cleaning reactors, etc.).
- sprinkling and care for greenery in case of intense drought (water from the Chvaletice power plant would be used)

Water treatment plant in the main water circuit

The aim of this unit is not to purify the water, but to maintain its properties within the set limits. During water treatment, the pH will be corrected with hydrated lime or sulphric acid if needed and decantation will be carried out in settling tanks. Clear water will be returned to the main circuit, sludge will be dewatered and disposed of by an authorized person outside the production plant as waste.

Under exceptional circumstances, such as a complete shutdown of production technology coinciding with intense rainfall, there is a possibility that all the retention capacities of mining reservoirs and potentially contaminated water reservoirs could be filled. In such instances, any surplus water captured would undergo discharge into the watercourse, following treatment at both the water treatment plant and industrial water treatment plant.

Fire water/hydrant circuit

A fire water circuit with hydrants will be built in the plant. This circuit will be connected to the fire water circuit of the Chvaletice power plant and KASI FOUNDRY a.s. (this connection already exists at present; the existing system will be modified for the new layout of the processing plant).

It is a closed system that is not connected to technology or other uses and therefore does not consume any water or generate any wastewater.

Total water balance

The overall water balance in the extraction and processing plant system is shown in the table below (Table No. 38). Considering the utilization of wet raw materials and the transfer of residues containing a substantial water content, it is essential to account for all water mass flows in the balance, encompassing not only liquid water but also other forms.

Table No. 38: Total mass balance of water in the processing and mining part of the plant

Water inputs and outputs 1)	**m3/day**	**m3/year**
Water inputs		
Water - liquid - all inputs 2)	2 172	716 760
Water - moisture raw materials	810	267 300
Water contained in used reagents	42	13 860
Water produced by chemical reactions	81	26 730
Total amount of water - inputs	***3 105***	***1 024 650***
Water outputs		
Water - evaporation from cooling towers	1 585	523 050
Water - evaporation from other devices 3)	121	39 930
Wastewater from industrial water treatment plants	84	27 720
Water contained in products	30	9 900
Water - humidity of residues for storage (NMT/LR)	1 078	355 740
Water - gypsum moisture	110	36 300
Water - humidity $MgCO_3$	70	23 100
Water in filter cakes (waste)	12	3 960
Sprinkling and care for greenery	15	4 950
Total amount of water - outlets	***3 105***	***1 024 650***

Note:
(1) Average values
2) allocation of inputs, see Table No. 39
3) it is evaporation from reactors, storage tanks and drying of products

Table No. 39: Industrial water resources - average level/average rainfall

Industrial water resources 1)			
Fluxes	m3/day	m3/year	%
Total water consumption - see Table No. 38	***2 172***	***716 760***	***100***
Mining water from mining and storage	42	13 860	1,9
Rainwater (clean water) from mining and storage areas	will not be used		

Industrial water resources [1)]			
Contact water from the processing plant area [2)]	77	25 410	3,5
Rainwater (clean water) from the processing plant area	44	14 487	2,0
Process water/steam water used in ammonia recovery [3) 4)]	696	229 680	32,0
Bleeding water from the power plant [5)]	1 313,10	433 323	60,5
Total inputs	***2 172***	***716 760***	***100***

If necessary, process water can be temporarily replaced by blow-off. In this case, the entire consumption of the processing plant is covered by the blow-down and amounts to a consumption of 2 172 m3/day (see Table No. 40).

Table No. 40: Industrial water sources - dry season

Industrial water resources [1)]			
Fluxes	m3/day	m3/year	%
Total water consumption - see table	**2 172**	**716 760**	**100**
Mining water from mining and storage	0	0	0
Rainwater (clean water) from mining and storage areas	will not be used		
Contact water from the processing plant area [2)]	0	0	0
Rainwater (clean water) from the processing plant area	0	0	0
Process water/steam water used in ammonia recovery [3) 4)]	696	229 680	32,0
Bleeding water from the power plant [5)]	1 476,00	487 080	68,0
Total inputs	**2 172**	**716 760**	**100**

Note:
1) *The amount of water from sources that are related to precipitation fluctuates and is not influenceable. During operation, all quantities of this water will always be used, and the rest of the consumption will be covered by variable amounts of blow-off from the Seven power plant.*
2) *Contact water is similar to mine water, i.e. rainwater potentially contaminated by chemicals, intermediates and products handled in a processing plant.*
3) *In ammonia recovery, direct heating is used, and therefore the condensate cannot be separated and reused to produce steam.*
4) *Process water for steam production will be purchased from the Chvaletice power plant.*
5) *Controlled flow ensuring water balance of the entire system.*

3. Other natural resources

Raw material resources

The mined raw material will be manganese tailings. The deposits Chvaletice-tailings cells 1,2 and Řečany-tailings cell 3 are of anthropogenic origin, created by the deposition of waste from flotation treatment of the raw material of the Chvaletice pyrite and manganese ore deposit.

Three tailings were used to store flotation waste sands, which were in operation until the end of 1961 (tailings cell No. 1), in the years 1962–1970 (tailings cell No. 2) and from 1971 until the cessation of pyrite concentrate production in 1975 (tailings cell No. 3). Waste slurry was fed into them by accumulating coarser sands at the edge, fine sludge being drawn into the sedimentation lagoon in the middle, and water from the lagoon was pumped back into operation.

The construction of the first tailings cell began in 1950. According to incomplete information, the basic perimeter dams were piled up from local loamy soils. After filling, the dams were further raised by piling up the sludge material. The so-called water towers were used to drain the tailings. At the tailings cell No. 1 it was a single, centrally located concrete object (Čepek and Švagr 1957), at the tailings cell No. 2 and 3 there were always two steel towers. These remarkable objects have been preserved to this day at the tailings cell No. 3, where they rise above the existing terrain due to the premature closure of the operation by about 20 m. Water was drained from the waste shafts by collectors led under the body of the tailings to the pits, from where it was pumped into a settling tank built north of the tailings cell No. 2.

A geological survey was carried out on the deposits, on which the calculation of the reserves was based. This calculation was discussed and approved at the 1200th meeting of the Commission for Projects and Final Reports of the Ministry of the Environment on 8.12.2017.(Tvrdý, 2017)

Further exploration work was carried out later, and the geological reserves were newly quantified on the basis of a mineral resources assessment conducted by the consulting firm Tetra Tech Canada Inc. (Barr and Huang 2019). The calculation is based on geological documentation and laboratory analyses of 1485 samples from 160 boreholes carried out between 2017 and 2018. The calculation was made as of 8 December 2018. The methodology of the new calculation is identical to the procedure chosen in the previous stage of the survey. The data was analyzed using Phinar X10-Geo v. 1.4.15.8, Snowden Supervisor v. 8.9.0.2, and Leapfrog Geo v. 4.4.2. Subsequently, a geological model was constructed using Leapfrog Geo v. 4.4.2. For data interpolation, the method of circular surfaces (spheroids) was used, which is based on common correction. The size of the microblock was set at 50 x 50 x 4 m. For the purpose of calculation, the microblocks at the edges of the housings were divided into sub-blocks of 12.5 x 12.5 x 2 m for calculation purposes.

The following table summarizes the results of the inventory calculation.

Table No. 41: Geological reserves according to the current Tetra Tech deposit model

Deposit	**Block**	**Category***	**Cubature (thousand m3)**	**Tonnage (etc.)**	**Bulk density (t/m3)**	**Mn total (%)**	**Mn leachable (%)**
Chvaletice-tailings cells 1, 2 (3104804)	1	PB	6 577	10 029	1,52	7,95	6,49
		VB	160	236	1,47	8,35	6,67
	2	PB	7 990	12 201	1,53	6,79	5,42
		VB	123	189	1,55	7,22	5,30
Recany-tailings cell 3 (3243700)	3	PB	2 942	4 265	1,45	7,35	5,63
		VB	27	39	1,45	7,90	5,89
Total both deposits		PB	17 509	26 496	1,51	7,32	5,86
		VB	309	464	1,50	7,85	6,05

Explanatory notes:
PB – geological reserves explored balance free, originally reported as Measured Mineral Resources
VB – geological reserves found balance free, in the original reported as Indicated Mineral Resources.

The new inventory calculation was again summarised in the final report. This calculation was discussed and approved at the 1210th meeting of the Commission for Projects and Final Reports of the Ministry of the Environment on 21 February 2020.(Tvrdý, 2019)

Materials and products used in remediation

The proposed technical solution of remediation and reclamation will require the import of additional materials to the repository. Given that the use of excavated soil and recycled material from demolition is expected, the number of imported materials will be significantly reduced compared to the assumption stated in the notification of intent. The imported products will be as follows:

- aggregate into the base layer before the start of the formation of dumps and further as material for the construction of other objects (roads, dam, etc.). It will be a common product for construction, crushed and mined aggregates, or clay soil for sealing,
- plastic insulating film - this is a standard product used for sealing landfills, as well as for insulating underground building structures against groundwater,
- geotextiles - this is a certified product for earthworks in construction,
- products for drainage system – plastic pipes, concrete parts,
- material for biological reclamation – seedlings, fertilizers, plant protection products, etc.

Chemicals and substances used in the production process – processing plant

Sulphuric acid H2SO4

- *CAS*: 7664-93-9
- *Annual consumption*: 183 000 t
- *Method of delivery*: The bulk product will be transported by rail in tankers. The approximate number of trains is 120/year, with each train (depending on length) carrying approximately 1,000 tonnes of sulphuric acid. Storage of H2SO4 will be carried out in the NW part of the track, near the acid storage tanks (B11). The acid stroage will be designed in accordance with legislation, the stroage area will be equipped with a collection tray in case of leakage during handling.
- *Method of storage*: Sulfuric acid will be stored in three single-walled tanks, each with a volume of 1,150 m3. The total storage capacity is 3,450 m3 (i.e. approximately 6,350 t). The tanks will be placed in a collection tank with a corner sump. It will be possible to process the acid captured after a possible leak in the technological process.

Ammonium sulphate $(NH4)_2SO4$

- *CAS*: 7783-20-2
- *Annual consumption*: 750 t
- *Delivery method*: Trucks in big bags on pallets.
- *Storage method*: Ammonium sulphate will be stored in big bags on pallets in the raw material warehouse.

Ammonium hydrogen sulphite $(NH_4)HSO_3$

- *CAS*: 17026-44-7
- *Annual consumption*: 3 120 t
- *Method of delivery*: Ammonium hydrogen sulphite will be delivered by a truck tanker for the transport of liquids. The capacity of the tank will be about 24 tons. It will be delivered in the amount of about 130 trucks per year. The material will then be pumped from the tank into two storage tanks located in the building next to the electrowinnig building.

- *Method of storage*: Ammonium hydrogen sulphite will be stored in two steel tanks (B32) with a volume of 38.5 m3 (total capacity of about 77 t). The tanks will be placed in a collection tray to catch possible leaks.

Sodium dimethyldithiocarbamate C5H10NS2Na

- *TIME*: 128-04-1
- *Annual consumption*: 870 t
- *Delivery method*: Sodium dimethyldithiocarbamate will be supplied by a tank for the transport of liquids, with a tank capacity of about 27 tons. The material will be pumped from the tank to the storage tank in the purification building.
- *Method of storage*: It will be stored in one steel tank (B06) with a volume of 56 m3 (about 66 t). The tank will be placed in a collection tray to catch possible leaks.

Ammonia water NH3 (aq)

- *CAS*: 1336-21-6
- *Annual consumption*: 1,555 t; approx. 100 t at the start of the technological process
- *Method of delivery*: Ammonia water will be supplied by a truck tanker for the transport of liquids. The capacity of the tank will be about 24 tons. It will be delivered by about 65 trucks per year. The material will be pumped from the tank into a tank in the area of the ammonia recovery unit.
- *Method of storage*: Ammonia water will be stored in one steel tank (B10) with a volume of 100 m3, total capacity of about 90 t.

Flocculant – PAM (powder)

- *Annual consumption*: approx. 10 t
- *Delivery method*: Trucks in big bags on pallets. Approx. 700 kg/big bag. Transport will be carried out periodically in smaller batches.
- *Method of storage*: The material will be stored in hall B10 in original big bags before use. The total amount of stored material will be about 4 t.

Flocculant – mixture of acrylamide and sodium acrylic (powder)

- *Annual consumption*: approx. 67 t
- *Delivery method*: Trucks in big bags on pallets. Approx. 700 kg/big bag. Transport will be carried out periodically in smaller batches.
- *Method of storage*: The material will be stored in hall B03 in original big bags before use. The total amount of stored material will be about 8 t.

Calcium oxide (quicklime) CaO

- *TIME*: 1305-78-8
- *Annual consumption*: 75 000 t
- *Method of delivery*: The bulk product will be transported by rail (RAJ wagons or similar). The approximate number of trains is estimated at 60/year, with each train (depending on the length) carrying approximately 1,250-1,320 tons of calcium oxide. Material from the wagons will be pneumatically transported to storage silos.
- *Method of storage*: Calcium oxide will be stored in seven steel silos (B12) with a capacity of 318 m3. The total storage capacity of silos is 2,226 m3 (approximately 2,181 t). In order to reduce dust during lime transport or aeration of silos, the silos will be equipped with hose filters. Captured dust will be returned to the silos.

Barium sulphide BaS

- *CAS*: 21109-95-5
- *Annual consumption*: 1 080 t
- *Delivery method*: Barium sulfide will be transported by a special truck tanker for the transport of powder/fine piece material due to the high bulk density. The capacity of the tank is about 24 tons. About 45 trucks per year will be delivered. The material will be pneumatically transported from the tank to the storage silo located next to the purification building.
- *Method of storage*: BaS will be stored in one steel silo with a volume of 28 m3 (approx. 82 t). In order to reduce dust during transport, the silo will be equipped with a hose filter. The collected dust will be used in the production process (preparation of the suspension).

Activated carbon C

- *CAS*: 7440-44-0
- *Annual consumption*: 350 t
- *Delivery method*: Activated carbon will be delivered by trucks in big bags on pallets. About 17 cars per year will be transported, while about 20 tons of material/car will be transported. The material will be stored in the manganese sulphate solution purification building.
- *Method of storage*: The material will be stored in building B06 in original big bags before use. The total amount of stored activated carbon will be 50 t.

Sodium hydroxide NaOH

- *CAS*: 1310-73-2
- *Annual consumption*: 400 t
- *Delivery method*: IBC containers, solution approx. 40 %
- *Storage method*: IBC containers in raw material warehouse

Hydrogen peroxide (solution 22%) H_2O_2

- *CAS*: 7722-81-1
- *Annual consumption*: 20 t
- *Delivery method*: Hydrogen peroxide will be delivered by trucks, in IBC plastic containers with a volume of 1 m3. It is planned to deliver about 9 cars / year, while 3 containers / car will be transported.
- *Method of storage*: The material will be stored in the manganese sulphate solution purification hall before crystallization (B16). It will be stored in IBC containers located on collection trays for IBC containers.

Water glass (ca. 35% solution of technical sodium silicate) $Na2O(SiO_2)_x \cdot xH2O$

- *CAS*: 1344-09-8
- *Annual consumption*: 150 t
- *Method of delivery*: Material transport will take place by trucks, in IBC containers with a volume of 1 m3, i.e. about 1,200 kg/m3. The planned delivery is about 7 trucks per year, while it will be possible to transport 24 tons of material / truck.
- *Storage method*: Before use, the material will be stored in building B07 in IBC containers above the collection tank. The stored quantity will be 29 t (about 22 IBC containers).

Low-volume chemicals

In addition to the above-mentioned chemicals, a smaller amount of auxiliary chemicals will also be used, for example, for the operation of reverse osmosis and the cooling tower circuit (scale inhibitor, corrosion inhibitor, bactericide, reducing agent, pH adjustment agent, etc.), operation of an industrial water purifier (FeSO4, flocculant, pH adjustment agents, etc.), maintenance operation (lubricants, oils, etc.). The consumption of these chemicals will range from tens of kg to units of tons per year.

- *Delivery method*: Trucks in original packaging (barrel, barrel, bag), deliveries as required.
- *Method of storage*: The material will be stored in designated places directly in the halls where these chemicals will be used. The storage points will comply with applicable legislation. As a general rule, the quantities stored do not exceed 1 t (1 pallet of goods).

An emergency plan will be prepared for the facility pursuant to Act No. 254/2001 Coll. on Water and on Amendments to Some Acts, which will address the risks associated with possible leaks of harmful substances into the environment, will contain the necessary technical and organizational measures and will determine the system of periodic inspections.

4. *Energy sources (e.g. type, source, consumption)*

Fuels and lubricants

Diesel fuel will be used as fuel in four areas:

- mining and storage of mining waste – fuel for mechanization during overburden, mining and reclamation works
- siding area – shunting locomotive
- alternative source of electricity in the processing plant
- small mechanization in the processing plant

A fuel filling station (object b) will be located in the area of the quarry background. The fuel (diesel) filling station consists of an above-ground double-jacket fuel tank with an expected volume of 20,000 l. The tank is located in a leak-proof area. The volume of the reservoir is dimensioned for the number of deployed mining mechanisms in the quarry and its replenishment should be on a weekly basis. The expected annual diesel consumption is on average about 550,458 l/year.

In the area of the siding there will be a double-walled outdoor above-ground tank (object B43) with an expected volume of 20,000 l with a dispenser for the locomotive and a dispenser for small mobile mechanization of the processing plant. The estimated annual diesel consumption is 300,000 l/year for the siding and 130,000 l/year for the mobile mechanization of the processing plant. Replenishment will be coordinated with the replenishment of the reservoir in the mining area.

Diesel for the use of the emergency generator as an alternative energy source in the processing plant will be stored in a double-jacket tank with a capacity of about 2,000 l (object B40). This tank will be directly connected to the generator. The expected diesel consumption is 7,500 l/year, refilling will take place as needed and will be coordinated with the refilling of the above tanks.

Various types of oils and lubricants will be used in gearboxes and hydraulics of working machinery and equipment. Replacement of cartridges will be carried out in designated areas using appropriate devices to prevent leaks during replacement (e.g. drip trays). Large oil replacements will be carried out by a specialized company, for routine maintenance lubricants and oils will be stored in a dedicated warehouse in original packaging. The warehouse is equipped with equipment against leakage of hazardous and polluting substances. The pumping station and the oil and lubricant store meet the safety regulations valid in the Czech Republic. The fuel tank protection zone is located 12 m from other objects.

Electrical energy

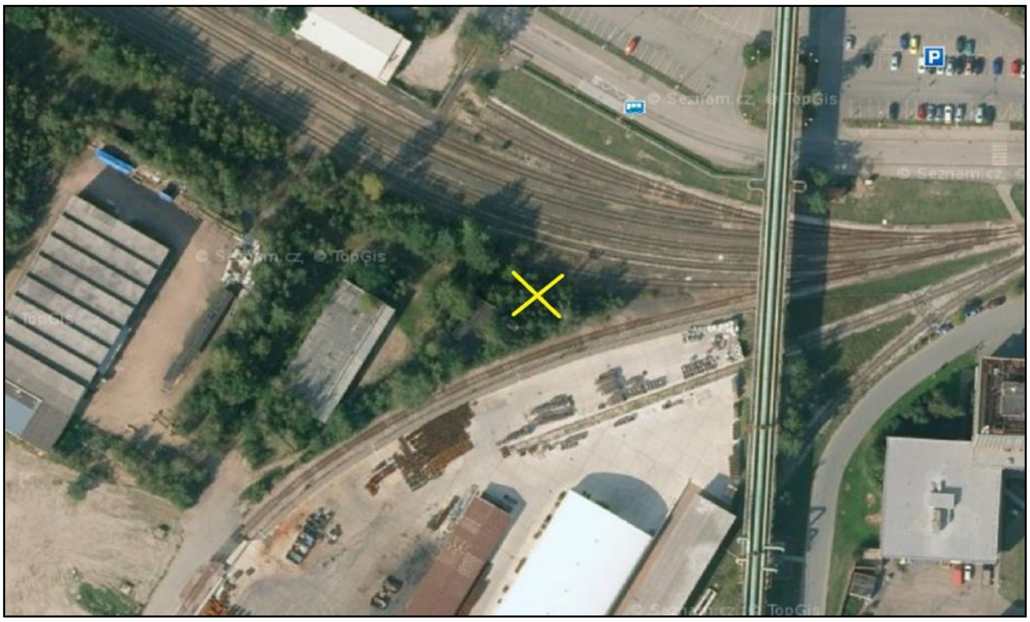
Electricity consumption for technological purposes is specified in the following table (Table No. 42).

Table No. 42: Electricity consumption - technological process

Stages of the process	Approximate input (MW)	Energy consumed (GWh/year)
Pulping and magnetic separation	1,8	11
Leaching and removal of Fe/P	3,4	28
Pregnant solution purification	2,1	14
Electrowinning	53,0	464
Leach Residue Purification	1,1	8
Additional extraction of manganese	1,4	12
Mg removal	2,9	23
MSM Production	8	70
Ammonia recovery	2,6	23
Auxiliary processes and general energy consumption	3,5	26
Transport of material and labour in DT	0,2	1
Total	**80**	**680**

Electricity will be supplied to the processing area by an underground cable from the 400 kV above-ground grid. The connection to the grid will be made in the area of the Chvaletice power plant, about 500 m east of the border of the processing plant. The approximate location of the connection point at the site boundary is shown on Picture no. 41. The exact position of the 400 kV cable will be defined in the project documentation for DUR so that there is no conflict with existing networks.

Picture no. 41: Approximate position of 400kV cable input to the processing plant area



Heat energy

Thermal energy for the process and heating of the buildings will be supplied in the form of superheated water (130° C, 10 bar) from the Chvaletice power plant. This energy will be used in the process for low-temperature applications (technological heating up to about 95° C), heating/tempering of buildings and for the preparation of domestic hot water. Superheated water will be supplied to the processing plant area from the eastern part of the site through a pipeline running in an existing pipe bridge on the side of the Chvaletice power plant, see Picture no. 42.

Picture no. 42: Connection point for superheated water from the Chvaletice power plant

Superheated water (primary heating circuit) will be distributed to local heat exchanger stations, from which heat will be further distributed through the secondary heating water circuit. Large duplicator reactors will be connected directly to superheated water.

After cooling, the primary heating water will be returned to the Chvaletice power plant along the same route.

The expected consumption of heating water is 50 - 75 t/h. The difference in the consumed amount of superheated water is commented in the chapter Natural gas.

Natural gas

The process will require higher temperatures (e.g. manganese sulphate drying) or direct steam heating (e.g. ammonia recovery process) for some applications. It will not be possible to use superheated water for these applications and it will therefore be necessary to generate steam by burning natural gas.

Steam will be generated in three boilers, two of which will be in operation, and one will serve as a backup (object B13). The consumption of natural gas for steam generation is shown in the table below (Table No. 43).

Table No. 43: Natural gas consumption

Variant	Annual consumption of NG	Daily consumption ZP MAX
	Mm3/year	m3/day
Basic variant 1) 3)	23,977	73000
Minimum consumption of NG 2) 3)	15,449	47000

Note:
1) The basic variant means that all heat consumed for steam production will be produced by combustion of natural gas. This option is used to calculate the emission model.
2) In this variant, steam production is two-stage. Feed water is first preheated with superheated water, and in the second stage steam is generated using natural gas. This leads to a reduction in natural gas consumption. The economic-technical evaluation of this variant will be carried out within the framework of detailed engineering.
3) The process dissolution of metallic manganese generates about 1,250 tons of hydrogen per year. Hydrogen will be (in both variants) co-burned with natural gas. The use of hydrogen reduces the consumption of natural gas by about 15%.

There are 2 variants for natural gas supply (see Picture no. 43):

- Supply through a reconstructed existing connection leading from the reduction station on the eastern edge of Chvaletice through Semenná hůrka to the EP Chvaletice complex.
- Inlet through a newly built connection from a gas pipeline running parallel to road 322.

The decision on variants will be made within the framework of the documentation for DUR.

Picture no. 43: Proposed connection points for natural gas supply

Note:
A) alternative to using the reconstructed ZP supply
B) alternative to the newly built ZP supply

5. *Biodiversity*

During the field survey focused on habitat mapping and the occurrence of specially protected species of plants and animals, which took place continuously from 2016 to 2022, it was found that the investigated area is important primarily from the point of view of animal occurrence.

The survey shows that there are natural biotopes in the territory:

- K3 High mesophilic and xerophilous shrubs,
- T1.1 Mesophilic oat meadows

and highly influenced habitats:

- X2 Intensively farmed fields,
- X3 Extensively farmed fields,
- X5 intensively farmed meadows,
- X7A ruderal herbaceous vegetation outside settlements, conservationally important stands,
- X7B ruderal herbaceous vegetation outside settlements, other stands,
- X9B Forest crops with non-native deciduous trees,
- X12B raids of pioneer trees, other stands,
- X13 non-forest tree plantings outside settlements,
- X14 watercourses and reservoirs without vegetation of conservation importance.

During the surveys, the presence of syntaxons *Arrhenatherion elatioris,* Berberidion vulgaris, Phragmitetum communis *variant* Urtica dioica *was detected.*

The largest part of the area of the deposits is occupied by extensive meadow vegetation, probably established by bulbous oat grass on the former tailings. *Festuca rubra* (red fescue) is used as a subdominant. Locally (rather on the roads) there is a weakly developed vegetation of shallow drier soils, which tends to the habitat T5.5 - Acidophilous grasslands of shallow soils. The tailings are separated by an artificially created valley into which water is drawn, and the vegetation here has a slightly wetland character in places. Spontaneously spread bushes, mainly hawthorn. These, however, are constantly nibbled by animals, and therefore do not reach a larger stature. The slopes are partly overgrown by a sparse raid of pioneer trees, whose herbaceous undergrowth is dominated by shrubby reed and creeping pyre. In particular, the northern slope is artificially forested (blue spruce, Norway spruce, ash, heart-shaped linden, sycamore). In the northern part of the territory there is a mixture of silver birch and acacia thorn, which creates a continuous stand that has mainly the character of a preparatory forest in the rod phase. The herbaceous undergrowth is strongly ruderal.

In the area of the project south of road II/322 (plant area) there is mainly vegetation before a long period of sown lawns and planted trees. Furthermore, the vegetation of ruderal and long-term uncultivated (planted and self-seeded trees) areas.

During the survey, the presence of 335 plant taxa was detected. The only specially protected species found is the red yew. These are individuals originating from artificial planting. The Red List of Plants of the Czech Republic includes Blitum bonus-henricus (C4a), Carex Curvata (C3), Silene Baccifera (C3) and Filago arvensis (C3), Filago minima (C3), Epipactis helleborine (C4a), Euphorbia waldsteinii (C4a), Centaurium erythraea (C4a), Inula salicina (C4a).

When surveying invertebrates, 7 species were recorded, which are listed in the Red List. Two species are critically endangered (CR), one species is endangered (EN) and four species are vulnerable (VU). Of the specially protected invertebrates, the occurrence of ants of the genus Formica, bumblebees of the genus Bombus and Oxythyrea funesta have been confirmed in the area.

The survey confirmed the occurrence of 76 vertebrate species: 6 species of amphibians, 3 species of reptiles, 51 species of birds and 16 species of mammals. Twenty recorded vertebrates are among the species specially protected. Vertebrate species found are listed in Part C.

A total of 23 recorded animal species include: slowworm, bumblebee, newt, common toad, green toad, raven, common quail, meadow bunting, corn bunting, ant, swallow, lizard, red-backed shrike, nightingale, whistling bat, evening bat, grass snake, golden grouse, black flower chafer, partridge, agile frog, edible frog, whinchat, red squirrel, red squirrel.

Details on the occurrence of valuable and specially protected species of organisms and the impact on biodiversity are given in Parts C and D.

6. *Demands on transport and other infrastructure*

The transport solution is based on the design work of SUDOP PRAHA a.s. Firstly, it is a railway siding project and a road connection study, which is also Annex No. 9 to this documentation.(Páník, 2021)(Melzer, a další, 2022)

Transport during the construction of the processing plant – outlook 2025

The transport of material during the construction of the processing plant will be carried out for the most part by road transport. Rail transport at the time of the construction of the plant will be used only minimally, it will represent only about 5 trains per year, and only at the time of wagon loads.

Waste, scrap, etc. will be removed from the plant. A prerequisite is to direct the vehicles to landfills in nearby Zdechovice, Přelouč, to the Granita quarry, or to Pardubice.

For the removal of waste material, scrap, soils and the like, standard trucks with a payload of 12-20 tons are considered, according to the needs of each material. The values are shown in the following table (Table No. 44), which shows the number of vehicles per average working day, always related to the type of cargo carried. In 2025 (prospective status), the average number of trucks leaving the plant site should not exceed 15 vehicles/working day, and this is data valid for one direction.

Table No. 44: Transport associated with the removal of material from the project site during construction (year 2025)

From	Specification	t/period	t/working day	aut/working day
Plant	Waste, scrap and the like	72 000	277	13,8
Mining	Waste, scrap and the like	8 000	31	1,5
	Wood	17	0	0
Total		**80 017**	**308**	**15**

The delivery of material to the project site during construction represents higher volumes. Vehicles intended for material delivery are considered with a payload of about 20 tons / vehicle, for a mixer around 16 t / vehicle. Mainly concrete will be weighed. The processor is considering use in the vicinity of existing concrete mixing plants, especially ZAPA beton a.s., operating in close proximity to the project. Furthermore, the import of prefabricated concrete parts is also considered, e.g. from the nearby premises of TIBA BETON CZ, s.r.o. The numbers of vehicles entering the site (for 2025) are shown in the following table (Table No. 45).

Table No. 45: Transport associated with the import of material to the project site during construction (year 2025)

Destination	Specification	t/period	t/working day	aut/working day
Plant	Concrete	50 400	194	12,1
	Steel	5 400	19	1
	Masonry (brickwork)	900	35	1,7
	Sand, gravel	2 700	10	0,5
	Other building materials	3 024	12	0,6
	Technology	3 558	14	0,6
Mining	Concrete	5 600	22	1,3
	Steel	560	2	0,1

Destination	Specification	t/period	t/working day	aut/working day
	Masonry (brickwork)	1 000	4	0,2
	Sand, gravel	300	1	0,1
	Other building materials	336	3	0,1
	Technology	1 525	6	0,2
	Mining - natural material	18 963	73	3,6
	Mining - building material	4 160	16	0,8
Total		**106 166**	**410**	**23**

All vehicles heading to/from the plant or mining site will be loaded only in one direction, in the opposite direction they will drive empty. The numbers of passenger cars and light trucks are considered to be very low during construction and were determined on the basis of an expert estimate by the author of the Transport Study.

The routing of trucks to the quarry area south of the project was chosen by I/2, which seems to be the most appropriate route for these vehicles. At first glance, a route through Chvaletice would be offered, but there is a restriction of entry for vehicles over 12 tons. From the plant, they first set off in an easterly direction to continue in a westerly direction at the II/322 x I/2 crossroads. Although there is no traffic measure that would prevent vehicles from shortening the route along the III/3228a through Zdechovice, heavy trucks were considered to detour on roads of higher classes up to the aforementioned intersection. Passage on III/3228 and is not suitable for heavy goods vehicles, but smaller trucks can shorten their journey on class III.

Transport during plant operation – outlook status 2028

The cargo will be transported by road and rail during the operation of the plant.

<u>*Traffic*</u>

The number of passenger vehicles leaving the processing plant was set in the Traffic Study at less than 180 vehicles/working day. The number of passenger vehicles leaving the mining area was estimated at about 24-27 vehicles per working day.

The total number of trucks generated by the intention averages around 42 trucks/working day. This figure is derived from data on vehicles carrying material in and out of the project. Details are given in the following tables (Table No. 46 and Table No. 47).

Table No. 46: Product and material exported from plant site and mining by road (year 2028)

Whence	Specification	t/year	t/working day	aut/working day
Plant	Ex-works products	79 500	306	13,1
	Intermediates ex works	150 000	577	23,1
	Waste, scrap and the like	4 680	18	0,9
	Municipal waste and similar	1 404	5	0,3
Mining	Waste, scrap and the like	520	2	0,1
	Municipal waste and similar	156	1	0,0
	Wood	9	0	0,0
Total		**236 269**	**909**	**38**

The project will mainly focus on the final product and intermediate product, and to a much lesser extent on waste, etc. A total of about 38 vehicles/working day is expected.

The outlook for 2028 also assumes the total number of vehicles entering the project, which is around 4 trucks per working day on average.
Part of the auxiliary material will be transported by light freight transport, which is documented in a separate table (Table No. 48).

Table No. 47: Material imported into the plant and mining area by road - heavy goods transport (year 2028)

Whither	Specification	t/year	t/working day	aut/working day
Plant	Auxiliary material and the like	5 200	20	1
	Fuel	361	2	0,2
	Raw materials and materials for the company	10 229	39	1,6
Mining	Fuel	460	1	0,1
	Mining - natural material	4 741	18	0,9
	Mining - building material	2 080	8	0,4
Total		**23 071**	**89**	**4**

Table No. 48: Material imported into the plant and mining area by road - light freight transport (year 2028)

Came	Specification	t/year	t/working day	aut/working day
Plant	Auxiliary material and the like	5 200	20	11

As in 2025, routing of heavy goods vehicles have been routed westwards (on the D11) along the I/2, which seems to be the most appropriate route for these vehicles. At first glance, there are several shorter routes, but they are either limited to freight transport or are passing through places with inappropriate directional or width conditions. From the plant, they first set off in an easterly direction to continue in a westerly direction at the II/322 x I/2 crossroads. Again, with a few exceptions, the routing of vehicles along III/3228a is not considered.

The average intensity of induced traffic for day and nighttime, distinguishing between the exit towards DP (Mining) and the processing plant (Plant), is summarized in the following table.

Table No. 49: Transport Balance (2028)

		Cars	Light trucks	Heavy trucks
The	Plant	288	23	81
	Mining	27	6	3
	Total	315	29	84
Night	Plant	72	0	0
	Mining	27	0	0
	Total	99	0	0
Total	Plant	360	23	81
	Mining	54	6	3
	Total	414	29	84

Rail transport

Rail transport will be used both for the transport of material to the company and for the distribution of the product to customers.

The material imported to the plant by rail will consist mainly of sulphuric acid (H2SO4) and calcium oxide (CaO) in a total volume of 258 000 tonnes per year. The total number of pairs of trains per year delivering material to the plant site is estimated at 250. The following table provides an overview of the transport of material to the plant by rail (Table No. 5050).

Table No. 50: Material imported into the plant by rail

Material	Trip source	t/year	Frequency of trains	Frequency of train pairs per month	Load weight	Pairs of trains per year
Sulphuric acid H2SO4	Neratovice	18 000	1 x in 20 days	1.4 x in 28 days	1 000	18
	Pichelsdorf (AT)	20 000	1 x in 13 days	2.2 x in 28 days	740	27
	Hamburg (DE)	50 000	1 x in 7 days	4 x in 28 days	1 000	50
	Mannheim (DE)	18 000	1 x in 20 days	1.4 x in 28 days	1 000	18
	Firenze (IT)	10 000	1 x in 36 days	0,8 x in 28 days	1 000	10
	Glogow (PL)	50 000	1 x in 7 days	4 x in 28 days	1 000	50
	Northern Germany	17 000	1 x in 21 days	1.3 x in 28 days	1 000	17
Calcium oxide CaO	Tmaň, Čertovy schody	30 000	1 x in 15 days	1.9 x in 28 days	1 250	24
	Stramberk	45 000	1 x in 10 days	2.8 x in 28 days	1 250	36
Total		**258 000**				**250**

The quantity of product exported out of the factory is clearly shown in the following table (Table No. 1). Since the directions of dispatch depend on the location of potential customers and at the moment the list of customers is not definitive, it was chosen to divide these volumes into western and eastern directions equally (as in the case of road transport). This is only an export of manganese sulphate, all exports of the production of electrolytic metal manganese are, according to the treasures, considered by road.

Table No. 51: Product exported from the factory by rail (year 2028)

Commodity	Division into trains	Direction	Cover	t/year	Frequency of trains	Frequency of train pairs per month	Mass of load/block train	Pairs of trains per year
Manganese sulphate	1/3 of the volume as a complete train	In	BIG BAGS	2 083	1x in 104 days	0,3x in 28 days	644	3,5
			SMALL BAGS	4 167	1x in 80 days	0.4x in 28 days	989	4,5
		With	BIG BAGS	2 083	1x in 104 days	0,3x in 28 days	644	3,5
			SMALL BAGS	4 167	1x in 80 days	0.4x in 28 days	989	4,5
	2/3 of the volume as half of a complete bag	In	BIG BAGS	4 167	1x in 28 days	1x in 28 days	-	13,0
			SMALL BAGS	8 333	1x in 21 days	1.3x in 28 days	-	17
		With	BIG BAGS	4 167	1x in 28 days	1x in 28 days	-	13,0

Commodity	Division into trains	Direction	Cover	t/year	Frequency of trains	Frequency of train pairs per month	Mass of load/block train	Pairs of trains per year
			SMALL BAGS	8 333	1x in 21 days	1.3x in 28 days	-	17
Total				**37 500**	**1x in 4 days**	**7x in 28 days**		**76**

As can be seen from the table, 1/3 of the product freight will be transported by block trains, 2/3 of the freight will then be budgeted to fill about half of the complete train. In total, about 76 pairs of trains with the product will be transported from the plant per year.

Transport during plant operation – outlook status 2043

It is planned that in 2043 the amount of material and exported product will be the same as in 2028, as well as the volume of freight transport. Given that it follows from the above that no increase in production is considered over time, it can be assumed that the number of employees will also be constant in years, so the volume of passenger traffic generated has also been retained.

The routing of freight vehicles to the west is considered in the same way as in 2028, i.e. through the I/2 x II/322 intersection. It should be mentioned that based on information from representatives of the Central Bohemian Regional Authority there is a possibility of building a north-south junction of roads II/322 and I/2 in the area of Kojice – Kobylince. It can be assumed that this clutch would take over, among other things, vehicles heading west from the project (D11). However, it has not been considered in the transport model, as it is currently not included in any part of the zoning documentation (ZÚR Středočeský, ZÚR Pardubický or ÚP of all affected municipalities), which could hypothetically be affected, and it is therefore not clear from the processor's point of view whether it will be implemented and when.

Capacitive assessment of road connections

Intersection II/322 x Manganese road

It is a contact uncontrolled intersection of road II/322 with a purpose-built road to the Mangan Chvaletice complex. The intersection is located in an urban area in the municipality of Trnávka between the villages of Chvaletice and Řečany nad Labem. The main road is road II/322 leading through the junction directly. The secondary road is a purpose-built road to the Mangan area, the crossing angle is about 90 °. Adjustment of the right of way is solved (assumption in prospective condition) by vertical traffic sign P4 – Give way!

There are no additional lanes for turning or connecting on the main road. The exit from the side road is with an ambiguous extension for approximately 2 vehicles (about 12 m). On the main road, a maximum permissible speed of 90 km/h is considered. This junction allows all intersection movements. There are no paths and pedestrian crossings or crossing points nearby that would affect traffic at the intersection under consideration. The intersection was assessed for prospective traffic volumes in 2025 (during construction) and 2043 (distant outlook). Furthermore, the intersection was inspected for an increased number of trucks at the entrance and exit to the Mangan area (the surrounding state is the same as in 2043). This scenario was assessed to test how many vehicles the intersection is able to pass without worsening the ICS.

Intentionally, these are very overestimated numbers of vehicles (about 500 trucks per day in one direction were chosen), but for which the intersection still has a reserve capacity. The number of cars and light trucks remains unchanged (standard year 2043).

The assessed intersection will meet the capacity for the considered horizon 2025. The highest delay at the intersection is at the exit of the Mangan area, 4 s. The requirements for the level of transport quality are met on both the main and secondary roads. The overall ÚKD of the intersection is at level A.

For the considered horizon of 2043, the assessed intersection will meet the capacity. The highest delay at the intersection is again at the exit of the Mangan area, 6 s. The requirements for the level of transport quality are met on both the main and secondary roads. The total ÚKD of the intersection is at level A. Similarly, the intersection will meet even in the case of an artificially increased number of trucks to 500 vehicles per day. The highest delay in this case would be in the same place and would reach 8 s. The overall ÚKD of the intersection would also be at level A.

7. Mining waste as a feedstock for remediation

As described in Chapter B.I.6Material from manganese ore treatment will be deposited back into the mining area and will be used for remediation and land reclamation. After treatment and obtaining the utility component (manganese), the same (in fact slightly higher) amount of material remains. Due to its quantity, there is practically no other use than return to the original space.

The material will be secured in a way that corresponds to the current technical possibilities and requirements for environmental protection, even though the components that cause today's subsoil contamination will be removed from it during treatment.

The stored material will consist of two components, which will be transported to the mining area from the production plant already mixed. For the purpose of the mining study, two samples labeled NMT (non-magnetic, non-magnetic fractions after magnetic separation) and LR (leaching residue, leaching waste) were submitted for analysis. Basic classification analysis and compaction tests (Proctor Standard), IBI (Immediate Bearing Index) and CBR (California Bearing Ratio) were performed on both samples. Furthermore, a mixture of samples was created from the remains of the samples in a ratio of 55:45, the sample was marked as NMT/LR. On this sample, granular classification of the material was carried out. It is believed that this mixed material will be the main component of dumps. Information for individual samples is given in the tables below.

Material management after modification will be fully subject to Act No. 157/2009 Coll., on Mining Waste Management and on Amendments to Certain Acts, as amended (hereinafter referred to as the "Mining Waste Act") and implementing regulations, in particular Decree No. 429/2009 Coll., Decree on the Determination of the Requirements of the Mining Waste Management Plan, including the Assessment of its Properties and Some Other Details on the Implementation of the Mining Waste Management Act (hereinafter referred to as "Decree No. 429/2009 Coll.").

Material from the treatment is in terms of legislation characterized as mining waste according to the Waste Act. The inclusion is based on the opinion of the Czech Mining Authority dated 10.7.2019, ref. SBS20517/2019/ČBÚ-21, which was issued at the request of the investor.

For the storage of mining waste in accordance with the above-mentioned legal regulations, a so-called mining waste storage site will be operated. The requirements for the construction and operation of this storage site will be based, among other things, on the requirements of the State Mining Administration. Storage sites shall be classified in categories I or II with regard to their potential effects on lives, human health and the environment. The classification is carried out by the District Mining Authority (OBÚ) on the basis of the relevant application and documentation and after a risk assessment. The investor will be obliged to first apply to the OBÚ for this inclusion. The criteria for inclusion are detailed in Decree No. 273/2021 Coll.

The construction of a storage site within the boundaries of the mining area will again be permitted on the basis of an application and relevant documentation of the OBÚ. The application also includes a Plan pursuant to Section 5 of the Mining Waste Act. The municipality in whose territory the storage site is located is also a party to the procedure for the permission to build a storage site. Subsequently, the OBÚ permits the operation of the storage site by means of a separate procedure, in which the municipality is again a party.

An application for the inclusion of a storage site in a category associated with a risk assessment will be submitted to the OP at the stage of permitting mining activities. The current design of the storage space is designed in such a way that all risks associated with the construction and operation of the storage space are minimized. In particular, it is a determination of safe slopes of the final slopes of dumps and sufficient insulation. The insulation will be carried out towards the subsoil as well as towards the surface.

Already at this stage, the main principles for monitoring the condition of the storage space are proposed (see measures in Chapter D.IV).

A detailed description of the ore processing technology and treatment of residues after processing is given in Chapter B.I.6.

The results of the assessment of the geotechnical characteristics of mining waste (laboratory samples) are given in Chapter B.I.6 – Mining (Table No. 11), further details are given in the tables below. However, it should be noted that the test material, the results of which are given below, was obtained only from laboratory samples and therefore its characteristics may not be exactly the same as the waste that will be produced by the processing plant itself. Further specification of the properties of mining waste will be possible after obtaining its large-volume samples from the demonstration plant, which is currently being put into operation on the investor's premises. The final verification of the technology and the acquisition of representative waste samples is expected at the end of the trial operation, i.e. in I.Q.2024.

Table No. 52: Characteristics of the NMT sample

NMT sample (2021/380)	
Classification:	ČSN 73 6133: clay with low plasticity, F6 CL
	ISO 14688-2: siCl
Possible uses:	material not suitable for use in the active zone of the road (direct subsoil of the road), the material is conditionally suitable for use in embankment (i.e. after treatment, e.g. compaction, improvement of geotechnical properties by mixing with binder, etc.)
Frost content:	dangerously to highly icy

NMT sample (2021/380)	
Consistency at natural moisture:	Stiff to solid
Consistency of heavily moistened material:	soft to mushy
Natural humidity (after processing):	18 %
Optimum humidity for maximum compaction:	14.6% (for better compaction, it would be advisable to reduce the natural humidity a little more to bring it closer to optimal humidity)
IBI:	29.5 % (recommended minimum value for embankments 5-10 %) - immediate load capacity of naturally moist material is sufficient after compaction
CBR:	0.9 % (recommended minimum value for embankments 15 %) - the bearing capacity of strongly damp material is minimal and without the material treatment with a binder it will be completely unbearable when wet

Table No. 53: LR sample characteristics

Sample LR (2021/381)	
Classification:	ČSN 73 6133: clay with low plasticity, F5 ML
	ČSN EN ISO 14688-2: sisal
Possible uses:	material not suitable for use in the active zone of the road (direct subsoil of the road), the material is conditionally suitable for use in embankment (i.e. after treatment, e.g. compaction, improvement of geotechnical properties by mixing with binder, etc.)
Frost content:	dangerously to highly icy
Consistency at natural moisture:	Stiff to solid
Consistency of heavily moistened material:	soft to mushy
Natural humidity (after processing):	28,00 %
Optimum humidity for maximum compaction:	27.5% (natural humidity is close to optimum humidity)
IBI:	5.0 % (recommended minimum value for embankments 5-10 %) – the immediate load capacity of naturally moist material is after compaction at the limit of usability into embankments without prior treatment.
.CBR:	2.2 % (recommended minimum value for embankments 15 %) – the bearing capacity of strongly wet material is minimal and without the material treatment with a binder it will be almost unbearable when wet.

Table No. 504: Characteristics of the NMT/LR sample

Sample NMT/LR (55:45)	
Classification:	ČSN 73 6133: clay with low plasticity, F6 CL
	ISO 14688-2: saclSi
Possible uses:	material not suitable for use in the active zone of the road (direct subsoil of the road), the material is conditionally suitable for use in embankment (i.e. after treatment, e.g. compaction, improvement of geotechnical properties by mixing with binder, etc.)
Frost content:	dangerously to highly icy
Consistency at natural moisture:	Stiff to solid
Consistency of heavily moistened material:	soft to mushy
Natural humidity (after processing):	unknown, the mean of the previous two values is 23%
Optimum humidity for maximum compaction:	The Proctor test was not performed (lack of material), the mean of the previous two values is 21.1% (estimated optimum humidity 20-23%).
IBI:	the test was not carried out, the average of the previous two values is 17.25 % (minimum value for embankments recommended 5-10 %) – the instantaneous load capacity of naturally wet mixed material is assumed to be sufficient
.CBR:	1.6 % (minimum value for embankments recommended 15 %) – the load capacity of the mixed material will be minimal when wet

In summary, it was stated that the examined materials are fine-grained, with a character corresponding to clay with low plasticity, to clay with low plasticity. Their deteriorated geotechnical characteristics correspond to this. Significant is especially the almost absolute loss of cohesion and bearing capacity in the case of high material moistening. In dry conditions or natural humidity, the material can be used for storage in embankments, but at increased humidity it tends to strong slushiness and loss of bearing capacity. The load carrying capacity is likely to be increased by the addition of a suitable binder, appropriate tests would be necessary to verify this assumption.

Furthermore, tests of geochemical properties were carried out, especially with regard to the limits set by the Decree of the Ministry of the Environment No. 273/2021 Coll., on the details of waste management. The evaluation was carried out by the Research Institute of Mortar Materials Prague, s.r.o. (Jiroušková, Klimešová, 2021) separately for NMT and LR and subsequently, with a certain time interval, tests of a mixed sample 55:45 NMT/LR were also carried out. The absolute content of pollutants, leachability and classification into leachability and ecotoxicity were determined. The results of the environmental assessment of mining waste (laboratory samples) are presented in the tables below.

For comparison, there are also analyses of samples from our own raw material without treatment. These analyses date from 2018 and were already included in the letter of intent for the screening procedure. The results of the LR and NMT analyses from 2018 were also included in the notification of intent, however, for these preliminary tests, LR was washed according to a scheme that was not final for use in the project. In the following stages of preparation, the technological procedure was refined, when LR was washed under laboratory conditions according to the scheme that will be used in the project technology. Therefore, the results of the analyses may differ significantly from the dates stated in the letter of intent. However, it should be noted that the test material, the results of which are set out below, was again obtained from laboratory samples and therefore its properties may not be exactly the same as the waste that will be produced by the processing plant itself. Further specification of the properties of mining waste will be possible after obtaining its large-volume samples from the demonstration plant, which is currently being put into operation on the investor's premises. Results are expected in Q3 2023. However, the data below is accurate enough to carry out an environmental impact assessment. In addition, the proposed method of securing with an insulating foil provides sufficient margin for possible partial changes in the properties of mining waste.

Table No. 55: Maximum permissible values of parameters for individual leachability classes according to Table 10.1 of Annex No. 10 of Decree No. 273/2001 Coll. (Jiroušková and Klimešová, 2021)

Leachate class	**I(S-IO)**	**II a(S-OO1 and S-OO3)**	**II b(S-OO2)**	**III(S-NO)**	**Nemag. separation NMT**	**LeachResidua LR**	**Pooled sample 55% NMT a 45% LR**	**Raw material from the deposit**
Unit	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**
DOC	50	80	80	100	<0,50	<0,50	26,5	1,69
Simple. Phenols	0,1				<0,01	<0,01	0,25	<0,01
Chlorides	80	1500	1500	5000	5,57	6,29	3,46	2,47
Fluoride	1	30	15	50	0,43	0,79	0,58	0,63
Sulphates	100	3000	2000	5000	1440	1470	1810	661
As	0,05	2,5	0,2	2,5	<0,001	<0,001	<0,005	<0,002
Three	2	30	10	30	0,047	0,032	0,012	0,0719
Cd	0,004	0,5	0,1	0,5	0,0028	0,00022	0,0015	0,000199
Cr total	0,05	7	1	7	0,00076	0,0033	0,002	ND
With	0,2	10	5	10	0,0013	0,0017	0,0017	0,000150
Hg	0,001	0,2	0,02	0,2	<0,0003	<0,0003	<0,0003	<0,0003
Nor	0,04	4	1	4	0,26	0,021	0,16	0,253
Pb	0,05	5	1	5	<0,0001	<0,0001	<0,0001	ND
Sb	0,006	0,5	0,07	0,5	<0,001	<0,001	<0,001	0,005
Herself	0,01	0,7	0,05	0,7	<0,002	<0,002	<0,010	<0,002
Zn	0,4	20	5	20	0,098	0,0096	0,13	0,0099
Mo	0,05	3	1	3	<0,010	<0,010	<0,010	0,025
RL 105°C	400	8 000	6 000	10 000	2440	2060	3040	1200
pH	≥6		≥6		6,32	6,37	6,93	7,17
Conductivity (mS/m)	-	-	-	-	231,7	234,0	280,2	129

Explanatory notes: Values exceeding the limit for leachate class I are marked in red – comments below

The values given in column I also correspond to the limit values for backfilling in according to Table 5.2. Annex No. 5 to Decree No. 273/2001 Coll.

The content of pollutants in the aqueous leachate from the samples exceeds the maximum permissible values listed in Table 10.1 of Decree No. 273/2021 Coll. only for leachate class number I, and therefore they cannot be deposited in the landfill of the S-inert waste S-IO group or used for backfilling. Extracts of samples without exception shall comply with leaching class IIb.

In some cases, slight disparities are apparent between the values found for NMT and LR separately and for the NMT/LR pooled sample. This is due to the fact that the pooled sample was prepared outside laboratory conditions with a time interval from the origin of the NMT and LR samples. In the table above, values exceeding the limit for leaching class I are marked in red. These results can be stated:

Monohydric phenols and DOC

In the case of a pooled sample, the increased level for DOC and monohydric phenols is likely due to secondary contamination of the sample during the storage or mixing period, which occurred only after the collection of these samples. Small-volume samples are sensitive to this contamination. The determined value for the mixture does not correspond to the concentration from the raw material or to the concentration from the separate components NMT and LR. Therefore, the values for separate NMT and LR samples should be considered relevant. However, the DOC value for a pooled sample does not even exceed the limit value for leaching class I.

Sulphates

In the case of sulphates, a value of 681 mg/l was found in the raw material extract. Values in mining waste are 2-3 times higher. There was no difference between the NMT and LR values, which would indicate that the sulphate content is not increased by chemical treatment. The material at the tailings generally contains large amounts of calcium sulphate (gypsum), which is a consequence of the previous treatment of the raw material in the production of sulfuric acid. The maximum permitted value for leachate class I is exceeded for both raw material and mining waste, in the case of class IIb no sample is exceeded. Technological tests on the demonstration unit will focus, among other things, on the method of treatment of mining waste and its scrubbing in order to achieve the lowest possible values of soluble substances, including sulphates.

Nickel Ni

A value exceeding the leaching class for nickel has already been found in the raw material and after treatment, so there is no significant change. It is obvious that leaching removes most of the nickel from the raw material. After mixing the leachate with non-magnetic fractions (i.e. with the raw material only after electromagnetic separation), the nickel concentration logically increases proportionally to about half of the original value.

Solutes

Similarly to sulphates, the value in mining waste is about 2-3 times higher than in the raw material. Sulphates or other soluble salts contribute significantly to the value of RL. Since the content of soluble substances may not be homogeneous due to long-term leaching of the tailings, it is difficult to draw more detailed conclusions from the values found.

Furthermore, the results of ecotoxicological tests according to Table 5.3 of Annex No. 5 of Decree No. 273/2021 Coll. are given. The limit values of this table are related to the possibility of using waste for backfilling, i.e. for disposal in the field without any security.

Table No. 56: Limit values of ecotoxicological tests according to Table 5.3 of Annex No. 5 of Decree No. 273/2001 Coll. (Jiroušková and Klimešová, 2021)

Test organism	Requirement I.	Requirement II.	Non-magnetic separation NMT	Leach Residua LR	55:45 NMT/LR
Aliivibrio fischeri	There is no evidence of inhibition of light emission of bacteria greater than 25 % at a 15-minute exposure or at a 30-minute exposure.	There is no evidence of inhibition or stimulation of light emission by bacteria greater than 25 % at a 15-minute exposure or at a 30-minute exposure.	15 min inhibition 15,2 % 30 min inhibition 44.3%	15 minutes inhibition 10,8 % 30 minutes inhibition 10,2 %	15 minutes inhibition 59.8% 30 minutes inhibition 57.4%
Evaluation			Positive inhibition 44.3%	Negative inhibition 10,2%	Positive inhibition 57.4%
Pearl-eye Daphnia magna Straus	The percentage of immobilization of pearls shall not exceed 30 %.	The percentage of immobilization of pearls shall not exceed 30 %.	30/30 Mortality (immobilization) 100%	3/30 Mortality (immobilization) 10%	30/30 Mortality (immobilization) 100%
Evaluation			Positive 100% mortality	Negative 10% mortality	Positive 100% mortality
Desmodesmus subspicatus algae	There is no evidence of inhibition of algal growth greater than 30 % compared to control.	There is no evidence of inhibition or stimulation of algal growth greater than 30 % compared to control.	Algae growth inhibition 100 %	Algal growth inhibition 5.85%	Algal growth inhibition 47.88%
Evaluation			Positive 100% inhibition	Negative 5.85% inhibition	Positive 47.88% inhibition
Lactuca sativa salad	There is no evidence of inhibition of lettuce root growth greater than 50 % compared to control.	Not tracked.	Root growth inhibition 62.4%	Inhibition of root growth 20 %	Root growth inhibition 79.3%
Evaluation			Positive 62.4% growth inhibition	Negative 20% growth inhibition	Positive 79.3% Growth inhibition

Explanation of the table: Values exceeding the limit are marked in red – comment below

A sample of our own raw material from the tailings was not subjected to ecotoxicity tests. However, the magnetic separation process does not cause major changes in the chemical composition of the material, so similar results can be expected for the raw material as for the NMT sample. It is clear from the above results that the loužence is the only one that does not show ecotoxicity within the meaning of Annex 5 of Decree No. 273/2001 Coll. (i.e. for use for backfilling in the field without further protective measures). The leaching process therefore demonstrably reduces the ecotoxicity of the tailing's material. The issue of possible ecotoxicity was examined in more detail by the developer as part of the preparation of the plan. In addition to the chemical removal of toxic substances in the leaching process, it is possible that the removal of very fine particles from the tailing's material, where the ecotoxic effect may also be of a physical nature, also has an impact on the reduction of ecotoxicity.

Ecotoxicity is determined only for the recovery of waste for backfilling, it is not relevant for landfilling. The proposed method of securing mining waste with an insulating foil, which corresponds to the security of landfills, is therefore suitable and sufficient.

III. OUTPUT DATA

1. *Air, water, soil and subsoil pollution*

Air pollution

A dispersion study was prepared to calculate the production of emissions into the air and to evaluate the level of air pollution in the vicinity of the project. (Zambojová, 2022)

Source classification, emission limits and operating conditions

The mining part of the assessed project (i.e. the determination of the mining area and the permit for mining activities therein) is listed as a stationary source of air pollution according to Annex No. 2 of Act No. 201/2012 Coll., on Air Protection. It is a source with code 5.11: quarries, opencast mines of fuels or other mineral resources, processing of stone, fuels or other mineral resources (in particular mining, drilling, blasting, dredging, sorting, crushing and transport), production or processing of artificial stone, high-grade stonemasonry, preparation of building materials and concrete, recycling lines of building materials, with a total design capacity exceeding 25 m3 per day.

According to the cited Annex No. 2, the following are required for the authorization of this source:

1. Column A - dispersion study according to § 11 para. 9
2. Column C - operating rules as part of the operating permit pursuant to § 11 para. 2 point d)

In Decree No. 415/2012 Coll., Annex No. 8, point 4.5 sets out the technical conditions of operation:

1. Emissions of dust shall be reduced at all technological nodes, including the storage and transport of material where emissions of dust into the air occur. For example, the following can be used:

a) covering of sorting and crushing equipment and all transport routes,

b) installation of emission control equipment - dedusting, mist-drying, foam, sprinkler,

c) measures for the storage of dusty materials - closed storage areas, placing outdoor landfills on the leeward side, sprinkling them and building screens,

d) Measures for the transport of materials - regular cleaning and sprinkling of roads and handling areas, limiting the speed of movement of vehicles in the source area, covering the cargo areas of dispatching vehicles.

The above measures were taken into account in the preparation of the dispersion study and are also part of the measures for minimizing and eliminating air impacts in Part D.IV.

The process part (i.e. the treatment of manganese ore by magnetic separation and electrowinnig) does not have a corresponding classification in Act No. 201/2012. Classification under point 4.7 Treatment of non-ferrous metal ores could be considered. However, the emission limit corresponding to this activity according to Decree No. 415/2012 Coll. is set only for TZL at 50 mg/m3 (point 3.6.1. of Annex No. 8). This emission limit will be met with a reserve.

Sources of emissions

The operation of the project will create new sources of air pollution. In the dispersion study, individual emission sources are discussed in detail and emission flows are calculated. A brief summary of the sources of emissions for the mining part and part of the processing plant is given below.

a) Mining part

The following sources of air pollution will be generated in the mining part of the plant during the operation of the project:

- particle emissions (particle matter) from bulk material handling,
- resuspension of dust particles from surfaces due to weather conditions,
- resuspension of dust particles from surfaces due to automobile traffic, emissions from freight transport,
- emissions from mining engines,
- the emission of manganese contained in particulate matter.

Due to the high humidity of the mined material, zero dust emission is applied to the handling of mined materials. Therefore, only the dustiness when handling overburden material is calculated.

Another source of dust is the resuspension of dust from surfaces due to weather conditions, where the active overburden area is calculated. The active overburden area can be estimated at a maximum of 0.1 ha.

Intra-area transport can be considered a linear source of emissions. Here, the dust emissions from the road due to resuspension and the exhaust emissions of trucks are calculated. These are then calculated for off-site transport.

Another important source of emissions will be the combustion of diesel in the engines of all mechanization in the quarry, which are calculated from the relevant emission factors and from the expected diesel consumption.

The last source of emissions is manganese contained in particles of particulate matter. The content of the actual useful component of manganese in the raw material is about 6%. The calculation does not include sources of dust particle emissions from handling overburden of topsoil and subsoil, these materials do not contain manganese. The resulting values of manganese concentrations correspond to its content in dust particles emitted during the extraction of the raw material, i.e. during its transport accompanied by resuspension.

Emissions of dust (PM10 and PM2.5 particles), benzo(a)pyrene, benzene, NOx and NO2 and Mn were evaluated in the dispersion study.

The individual emission sources and their emission yields expressed in kg/year are listed in the following summary table (Table No. 7) cumulative annual emissions from both production and processing plants. Details on the calculation of emissions are given in the dispersion study.

The results of the calculations from the dispersion study and the evaluation of the impact on air quality are given in Chapter D.I.2.

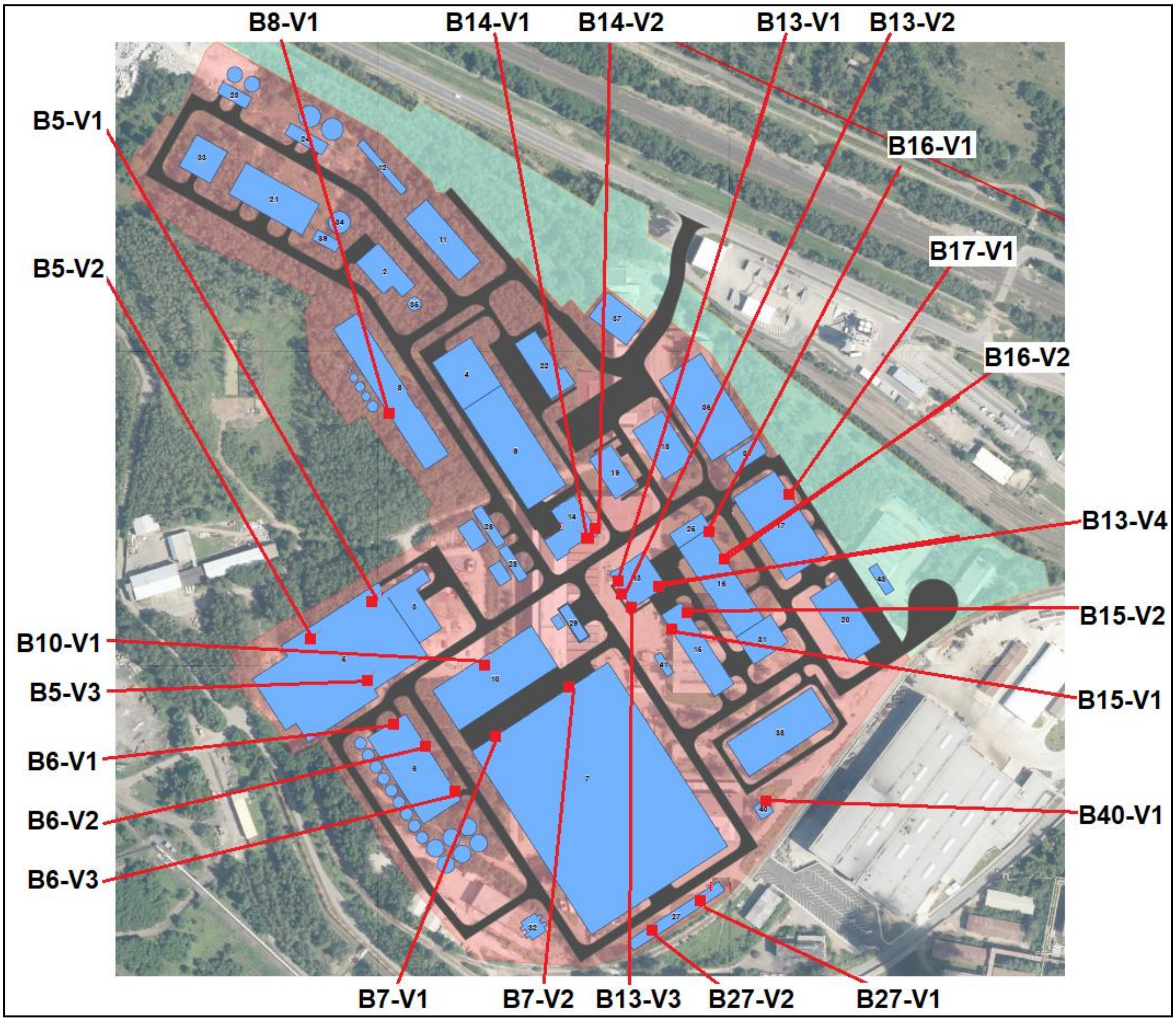
b) Processing plant

The following sources of air pollution will be generated in the processing plant:

- technological stationary sources of emissions,
- diesel generator,
- gas boiler room,
- lime oxide silos,
- generated rail transport,
- generated car traffic on public roads,
- Intra-area transport.

New sources of emissions will be technological stationary sources of manganese extraction from excavated material. The individual stationary emission sources are shown in the following picture (Picture no. 44). The labels correspond to the resource designations in the following table (Table No. 7).

Picture no. 44: Stationary sources of emissions in the processing plant area



The project also includes the installation of a diesel generator serving as an emergency source of energy in building No. 40 (exhaust marked B40-V1). The required electrical power of the device is 2 250 kVA.

Another source of emissions in the processing plant area will be a gas boiler room, which will be equipped with a total of three boilers, with only two boilers in operation and the third being installed as a back-up. The fuel in the boiler room will be natural gas and hydrogen produced during electrowinning. The primary pollutant released during the combustion of gaseous fuels, such as natural gas, is nitrogen oxides, with carbon monoxide being a secondary concern to a lesser extent. Since the emission of carbon monoxide is in the range of thousands of micrograms, no additional focus is given to this particular pollutant.

The operation of Lime Oxide Silos will be a source of solid pollutant emissions, which will occur both during pneumatic lime unloading and also during aeration/clarification of the silo.

Other sources of emissions in the plant area will be generated rail and car transport, both on public roads and intra-campus transport.

The individual emission sources and their emission yields expressed in kg/year are listed in the summary table below (Table No. 7) cumulative annual emissions from both production and processing plants. Details on the calculation of emissions are given in the dispersion study.

The results of the calculations from the dispersion study and the evaluation of the impact on air quality are given in Chapter D.I.2.

Table No. 57: Cumulative annual emissions from the operation of the mining part of the project and the processing plant

	Maximum annual emission flow (kg/year)								
	H2SO4	NH3	H2S	NOx	PM10	PM2,5	Bzn	BaP	Mn
B5 Leaching	53,7	55,4		-	-	-	-		-
B6 Pregnant solution purification			64,1		89,1	89,1	-		-
B7 Mn Electrowinning		316,8			12,9	12,9	-		10,3
B8 Mg removal		27,0					-		-
B10 NH3 recovery		142,6					-		-
B13 On-site steam generation				31594,6			-		-
B14 Technical building					85,6	85,6	-		-
B15 EMM dissolution					2,9	2,9			2,9
B16 MnSO4 solution purification			4,0						-
B17 HPMSM crystallization					171,1	171,1			56,5
B40 Emergency Power Plant	-	-		169,8	6,1	4,9	-		-
Silos					24,2	17,1			
Rail transport	-	-		13790,4	532,4	507,0	-		-
automobiletransport in the processing plant				120,0	28,2	21,1	2,2	0,0006	-

	Maximum annual emission flow (kg/year)								
	H2SO4	**NH3**	**H2S**	**NOx**	**PM10**	**PM2,5**	**Bzn**	**BaP**	**Mn**
Overburden				-	112,4	33,1			
Resuspenze				-	162,4	31,0			
Area transport in the tailings area				835,7	218,0	152,6			13,1
Diesel engines in the tailings area				13020,0	464,0	375,0			
Total	**53,7**	**541,8**	**68,1**	**59530,5**	**1909,3**	**1503,4**	**2,2**	**0,0006**	**82,8**

The table shows that with the highest emission flow of less than 60 t/year, nitrogen oxides will be emitted from the cumulative operation of the project. The dominant source of emissions is a heat source using hydrogen and natural gas as fuel, generated rail transport and diesel engines of mining machinery. The emission flow of PM10 particles is expected to be about 1.9 t/year, and PM2.5 particles at about 1.5 t/year. The emission of ammonia is expected to be 0.54 t/year, and the emission flow of sulfuric acid is expected at the level of about 54 kg/year due to the installation of scrubbers. The potential emission flow of hydrogen sulfide, whose release into the atmosphere is verified, can theoretically occur up to a maximum of 68 kg/year. According to the projection documents, manganese emissions are expected to be about 83 kg/year. Emissions of benzene and benzo(a)pyrene from generated car traffic can be described as insignificant.

Greenhouse gases

As part of the climate change impact assessment, it is a direct emitter of greenhouse gases (CO2):

- mechanization in the quarry,
- intra-area transport,
- off-site transport,
- siding operation,
- stationary sources of CO2 emissions in the raw material processing process.

CO2 production from diesel combustion in mining, intra-area transport and siding

Diesel fuel will be used in mining and intra-area transport as a fuel for mechanization during overburden, mining and reclamation works, as an alternative source of electricity in the processing plant and as fuel for small-scale mechanization in the processing plant area and for siding locomotives (see Chapter B.II.4). The total expected diesel consumption over the lifetime of the project is about 24,700,000 l, i.e. an average of about 988,000 l/year.

Indicative calculation of CO2 emissions from diesel combustion can be done, for example, using an estimate of the total annual fuel consumption and emission factors according to the 2016 update of the European Environment Agency (EEA) Air Pollutant Emissions Directive.

Table No. 58 Estimation of CO2 emissions from diesel combustion

Energy source	Consumption	Emission factor	CO2 emissions
Oil	988 000 l/year	3 160 kg CO2/t	2 623 t CO2/year

When calculating CO2 emissions, it can be stated that the ore will be extracted from rock that has already been extracted. The energy requirements for 1 t of such already processed material will be lower than in the case of obtaining manganese from primary sources, where the handling of the raw material, including crushing and sorting, would be significantly more energy intensive.

CO2 production during diesel combustion in off-site transport

Regarding off-site transport, it will involve both freight and passenger transportation. Since the specific destinations of these journeys are not precisely known, making a meaningful estimate of CO2 production is not feasible. In general, for economic reasons, the length of transport routes is minimized, which also leads to minimizing CO2 production. Freight transport will largely be carried out by rail, with a siding from the plant connected to an electrified track.

CO2 production in electricity consumption

The bulk of the electricity will be consumed in the processing plant, especially in the raw material processing process itself. It will also be consumed in auxiliary processes, in the transport of material and in work in the mining area. The total energy consumption of the project is 680 GWh/year and includes all of the above operations, including the general electricity consumption (see Chapter B.II.4).

For electricity-related sources, for the sake of simplicity, energy data can be derived from the information provided by the Ministry of Industry and Trade, as listed on the ministry's website. The most recent value is used for the calculation, an estimate of CO2 production from electricity production. energy for 2021. However, it should be noted that this emission factor will decrease in the future. The calculation of CO2 production is given in the table below.

Table No. 519 Estimation of CO2 emissions from electricity generation

Energy source	Consumption	Emission factor	CO2 emissions
Electricity	680 GWh/year	approx. 0.394 t CO2/MWh	267 920 t CO2/year

However, as regards the above calculation, it should be noted that the investor intends to purchase only electricity produced from renewable sources. It currently has a contractual relationship with the electricity distributor that covers about 30% of CO2 consumption with neutral electricity, and other contractual relationships for the supply of emission-free electricity are being prepared. In this case, the above calculation is purely theoretical and only illustrates how much CO2 would be produced from electricity consumption without this measure and using the current standard electricity mix in the distribution network.

Greenhouse gas production in the raw material processing process

During the process of leaching the concentrate with sulfuric acid (object B05), carbonates (carbonates Mn, Fe, Ca, Mg) decompose to form CO2.

In other process steps (removal of magnesium B08, recovery of Mn during removal of magnesium B08 and recovery of Mn from the leach residue washing solution B09), carbonate precipitation is performed. Waste CO2 instead of ammonium bicarbonate is used for carbonate precipitation to improve the environmental performance of the project, resulting in an overall reduction in CO2 emissions.

The total amount of CO2 emissions produced and emitted into the atmosphere from the raw material processing process per year is 58 687.22 t. Daily emissions amount to 177.8 t/day. An overview of CO2 consumption and use in the processing plant is given in the table below.

Table No. 60 Consumption and use of CO2 in the raw material processing process

Procesní krok	Toky CO_2 (t/h)			
	Vznik v procesu	Vstup do procesu	Výstup z procesu	Využito v procesu
Loužení a odstraňování Fe	**9.07** [1)]	0	3.43	0
Odstraňování Mg	0	3.62	2.54	1.08
Získávání Mn v procesu odstraňování Mg	0	0.6	0.42	0.18
Získávání Mn z prací vody	0	1.42	1.02	0.395
Celkem	--	--	**7.41** [2)]	**1.655** [3)]

Notes:
(1) Total amount of CO2 generated
(2) Amount of CO2 emitted into the atmosphere
(3) Amount of CO2 recovered for carbonate precipitation

CO2 production during gas combustion

Thermal energy for the process and heating of the buildings will be supplied in the form of superheated water (130 °C, 10 bar) from the Chvaletice power plant. This energy will be used in the process for low-temperature applications (technological heating up to about 95 °C), heating of buildings and for the preparation of domestic hot water. It is essential residual heat from the power plant, so the extraction of this heat is not associated with the production of greenhouse gases. The process will require higher temperatures (e.g. manganese sulphate drying) or direct steam heating (e.g. ammonia recovery process) for some applications. It will not be possible to use superheated water for these applications and it will therefore be necessary to generate steam by burning natural gas. Natural gas consumption is considered to range from 15.5 million m3 per year (minimum variant) to 24 million m3 per year (basic variant). Steam will be generated in three boilers, with two boilers in operation and one serving as a backup. The emission factor following the combustion of natural gas is equivalent to 0.2 t CO2/MWh, translating to 2.14 kg of CO2 per 1 m3 when converted, considering 1 m3 equals 10.69 kWh.

Table No. 61 Estimation of CO2 emissions from gas combustion

Energy source	Consumption	Emission factor	CO2 emissions
Gas – minimum variant	15.5 million m3/year	approx. 2.14 kg CO2/m3	33 200 t CO2/year
Gas – basic variant	24 million m3/year	approx. 2.14 kg CO2/m3	51 400 t CO2/year

Life Cycle Assessment Study

For the assessed project, a Life Cycle Assessment Study, the so-called Life Cycle Assessment, was prepared. *Life Cycle Assessment (LCA)*, conducted by Minviro Ltd. ("Minviro"), a UK-based sustainability and life cycle assessment company, and RCS Global Ltd. ("RCS Global"), a leading global auditor of battery material supply chains. The aim of the study was to compare the global warming potential ("GWP" or "carbon footprint") of the high-purity manganese products of the project under consideration with those produced by established industry in China – where 95% of the world's high-purity manganese products are currently produced.

The analyzed data was from public sources for various operating manganese plants. GWP (Global *Warming Potential) treatment routes* using both grid electricity and renewable electricity have been evaluated in accordance with LCA best practices and Global Battery Alliance requirements.

Based on the Life Cycle Assessment (Minwiro Ltd., 2021) using 100% renewable electricity, the project's global warming potential (GWP) will be 6.6 kg CO2eq. per 1 kg of electrolytic metal produced and 2,3 kg of CO2eq. per 1 kg of manganese sulphate. The conclusions of this study are set out in D.I.2 below.

Water pollution

The intention does not include the targeted emission of any pollutants into water except for the discharge of treated wastewater. The issue of water pollution is addressed in the next chapter.

Possible accidental releases of pollutants and the risks arising from them are dealt with in the relevant chapters of the documentation.

Soil pollution

The intention does not include the targeted emission of any pollutants into the soil.

Possible accidental releases of pollutants and the risks arising from them are dealt with in the relevant chapters of the documentation.

2. *Sewage*

Wastewater sources

1) Sewage
   - Sewage will be generated in the processing plant and in the area of the quarry's facilities (about 435 employees).
   - Annual production of sewage 12 800 m3.
   - The sewage system will divert water to a sewage treatment plant in the area of the quarry's background, where the water will be treated and subsequently discharged into the Elbe.

2) Industrial wastewater
   - The production of wastewater from the processing plant will be 84 m3 / day, 27 720 m3 / year.
   - Industrial wastewater will be treated at an industrial wastewater treatment plant, then it will be treated at a sewage treatment plant, and then the treated water will be discharged into the Elbe.

Sewage

The production of sewage will correspond to the consumption of drinking water for social purposes, a maximum of 435 employees per day are expected to be employed in the processing plant and in the technical facilities of the mining area. The annual production of sewage will be about 12,800 m3. Sewage water will be led to a sewage treatment plant.

The system of drainage of sewage from the plant area will be solved by connecting to a sewage system separated from other types of sewerage (industrial wastewater, potentially polluted water from roads and clean rainwater) and subsequently the wastewater will be drained through the existing underground pipes under the road and railway to the biological sewage treatment plant, which will be located in the area of the mining background (object H). The existing wastewater treatment plant will be rehabilitated for the needs of the project and a new wastewater treatment plant (object h) will be located instead. The biological section of the new wastewater treatment plant will be designed for 350 PE. The new WWTP will serve both for the treatment of sewage from the processing plant and for sewage from the mining area. At the same time, treated industrial wastewater will also be treated at this treatment plant.

Common sewage treatment technology using aerobic biological processes will be used for sewage treatment. Treated wastewater from this treatment plant will be routed through the existing water drainage system. It is an existing open concrete riverbed, which runs in parallel with the railway and the road towards the Elbe River, in the end part this channel is piped and leads into the Elbe at the port of Chvaletice.

This existing system also drains rainwater, discharged from the retention reservoirs in a controlled manner.

The composition of the quality of sewage will correspond to conventional municipal wastewater and contain mainly biodegradable substances. The quality of wastewater treated at the sewage treatment plant and subsequently discharged into the Elbe River will meet the parameters according to Government Regulation 401/2015 Coll. for wastewater discharged into watercourses (according to Annex No. 1, Table 1a – WWTP up to 500 PE).

Industrial wastewater

Mining part

No industrial wastewater will be generated in the mining part.

Processing plant

The plant operation will generate approximately 84 m3 / day, i.e. about 27,720 m3 / year of technological wastewater.

The process water treatment and purification system consist of 2 interconnected subsystems:

System for water treatment in the industrial water circuit:

This system maintains the quality/parameters of the circulating water within the required limits. This system is part of the technological process, there is no outflow from it into the watercourse, and therefore it is not described further.

Industrial wastewater treatment system:

In this system, part of the water from the industrial water circuit will be processed/treated. Water after passing through the industrial wastewater treatment plant (after reaching the required limits) will flow to a biological wastewater treatment plant and will then be discharged into the watercourse.

The area wastewater treatment plant will be located in the northwest part of the plant site (object B24), as part of the industrial wastewater treatment plant. The wastewater treatment plant will use a physico-chemical method of cleaning:

- Part of the water from the industrial circuit of the technological water (*after passing through the treatment plant*) will be drained into one of two mixed buffer tanks, which will work alternately. After filling the tank, the concentration of basic pollutants (*Mn^{++}, Mg^{++} and Fe^{++}) will be measured* and, if necessary, it will be:

- pH adjusted to the desired value by the addition of diluted milk of lime. Milk of lime, in addition to pH adjustment, also reduces the content of SO42 ions, creating impermeable CASO4
- the content of Mn2+ and Mg2+ is reduced by the addition of sodium bicarbonate solution, insoluble carbonates Mn and Mg are formed
- Fe2+ content reduced by aeration of the reaction mixture, insoluble oxo-hydroxides Fe3+ are formed

- After the precipitation reactions have taken place, a flocculant (approx. 1.1 kg/h) will be added to the suspension and the treated water will be led to an automatic settler.
- The sediment from the sediment (*especially compounds Ca, Mg, Mn and Fe*) will be processed in the tailings dewatering circuit after magnetic separation.
- Approximately 84 m3/day of flow from the sedimentation plant will be filtered through a sand filter and drained through the area sewerage system and subsequently through the existing water drainage system – the existing underground pipeline running under the track and the road and then drained into the sewage treatment plant.
- The amount of water discharged from the technological circuit will be regulated according to the composition of the water in this circuit. The above amount may fluctuate, the amount of discharged wastewater will be between 50-84 m3 / day, the value will not exceed 90 m3 / day. A value of 84 m3/day was used for the calculations.

The parameters of treated wastewater are given in the table below. Wastewater will be treated so that the output parameters meet the legislative limits for the discharge of wastewater into watercourses according to Government Regulation 401/2015 Coll. for wastewater discharged into watercourses (according to Annex No. 1, Table 2).

Table No. 62: Parameters of treated wastewater from wastewater treatment plants discharged into the Elbe

Pointer	Unit	Expected concentrations of pollutants	Legislative limit (CZ-NACE 7.00, 7.10, 7.29)	BAT according to NV401 (permissible - maximum)
As	mg/l	<0.02	0,5	
Ca	mg/l	<400	--	
With	mg/l	<0.04	1	
Fe	mg/l	<0.8	5	
Mg	mg/l	<60	--	
Mn	mg/l	<0.45	--	
On	mg/l	<150	--	
Pb	mg/l	<0.002	0,5	
Zn	mg/l	<0.25	3	
Hydrocarbons such as C10-C40	mg/l	<0.1	3	
Cl	mg/l	<150	--	
pH	-	6.5-7.5	6-9	
SO4	mg/l	<350	--	
CHSK-Cr	mg/l	<100		75 - 140
BSK5	mg/l	<30		22 - 30

NL	mg/l	<30		25 - 35
NH4	mg/l	<20		12 - 20
Ntotal	mg/l	<40		
Ptotal	mg/l	<2		

Mine water

In the area of raw material extraction, mine water will be generated. According to Section 40(1) of the Mining Act, mine water is all groundwater, surface water and precipitation water that has entered underground or surface mining areas, regardless of how it entered them. According to paragraph (2)(a) of the latter provision, an organisation is entitled to use mine water for its own use free of charge during mining activities. Similarly, according to Section 8(3)(f) of the Water Act, a water management permit is not required for the use of mine water by an organisation in mining activities for its own use or for the discharge of mine water by an organisation.

Mine water will be collected in local reservoirs, from there it will be drained into a retention tank and from there the water will be pumped to a pulping station, where it will be used to pulp the raw material (preparation of the raw material suspension).

The location of local reservoirs and mine water retention reservoirs will change during mining depending on its progress. The location, connection of the sumps and the capacity of the retention reservoir will be carried out in such a way that no mine water will be drained elsewhere than into the technological process. The capacity (volume) of the retention reservoir is designed for a 200-year rainfall. An overview of the capacities of retention reservoirs is summarized inTable No. 523.

Table No. 523: Capacity of the retention reservoir for mine water from the mining and reclamation area

Water type	***Retention tank capacity (m3)***	***Max. outflow into the stream (l/s)***	***Transfer capacity to process water system (l/s)***	***Designed for precipitation (years)***
Mining	3 500	X	15	200

Note:
In the case of filling the tank, there is a possibility of pumping the contents into the tank in the processing plant, intended for precipitation, potentially contaminated water.

The amount of mine water from the mining area will be approximately constant throughout the lifetime of the project because the size of the extracted area will vary minimally over the lifetime of the project. The amount of mine water will depend mainly on the intensity of precipitation.

Table No. shows a comparison of the amount of mine water during a dry, average and wet year (CHMI data was used for the calculation, meteorological station Chotusice, 2004–2018). The table also shows that the capacity of the retention reservoir and the amount of water consumed in the technological process significantly exceeds the amount of all mine and polluted water and therefore, even in extreme cases, there is no need to discharge mine water into the watercourse.

Table No. 64: Amount of mining, potentially contaminated and rainwater from mining, reclamation and processing plant

Množství vody	Průměrné množství důlních a potenciálně kontaminovaných vod								
	Suchý rok			Průměrný rok			Vlhý rok		
	Těžební oblast	Zprac. Závod	Celkem	Těžební oblast	Zprac. Závod	Celkem	Těžební oblast	Zprac. Závod	Celkem
Průměrně m3/d	30.8	88.7	119.5	42.0	121.0	163.0	173.0	506.0	679.0
Průměrně - m3/měsíc	923.6	2,660.8	3,584	1,260	3,630	4,890.0	5,190.0	15,180.0	20,370

There are 3 different sources of mine water in the field of reclamation:

1. Water from the built (unsealed) repository.
2. Water from an area that is being prepared for the next stage of the repository process (foil insulated area with a prepared drainage system but still free of mining waste). This water will be considered mining water.
3. Water from the drainage system of the already reclaimed part of the repository. The deposited mining waste will be damp and will absorb additional moisture from precipitation during the storage period before the installation of the upper insulating film. This water will only flow out temporarily – until hydraulic equilibrium is established inside the heap.

The expected drainage time of the mining waste repository after its insulation is 2 – 3 years. This value is an estimate calculated from a model that processes the dependence of material moisture on the particle size distribution. This is an informative value, even if the heap drainage would take longer, the drainage system will still be functional and therefore there is no risk of mine water leakage into the surrounding environment.

Water from all 3 sources will be captured in the same way as mine water from the mining area and led to a retention reservoir, where it will be mixed with mine water from the mining part and treated together with them.

The amount of mine water from the reclamation area will be approximately constant throughout the life of the project, as reclamation will be carried out in parallel with the mining process. The amount of mine water from the reclamation area will depend mainly on the intensity of precipitation.

Drainage of the mining part

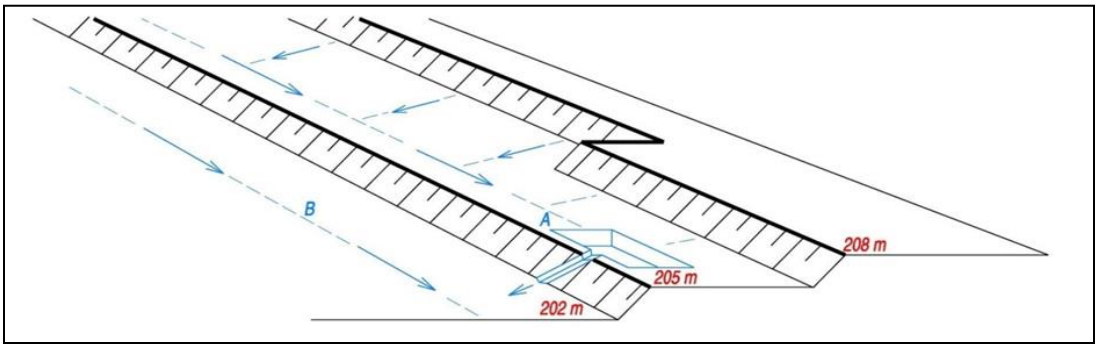
The drainage system is divided into two basic parts:

a) drainage during mining operations
b) drainage after completion of mining work, drainage drainage system.

Mining

The mining area will be drained by an open drainage system to the lowest points of the quarry, from where mine water will be gravitationally drained into the central retention pit (shaft). All mine water will be used in the technological process.

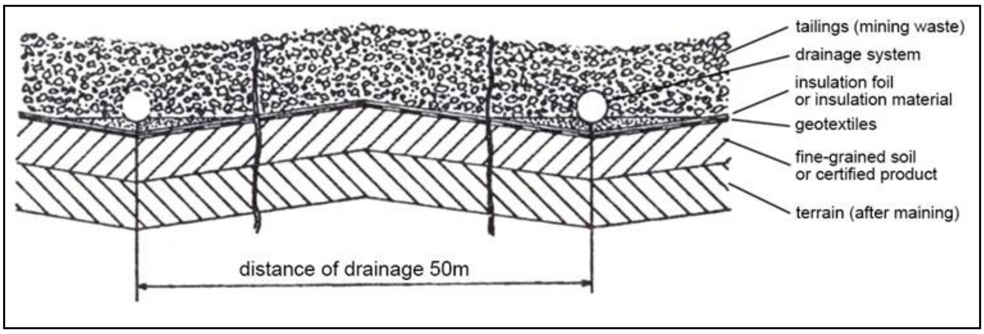
Picture no. 45: Scheme of an open drainage system in mining (contaminated water)



Termination of mining and reclamation

The area after the end of mining will be drained by a drainage system. This drainage system will divert residual water from the built dumps. The composition of drainage and insulation layers is shown in the following picture.

Picture no. 46: Composition of drainage and insulation layers under the mining waste repository

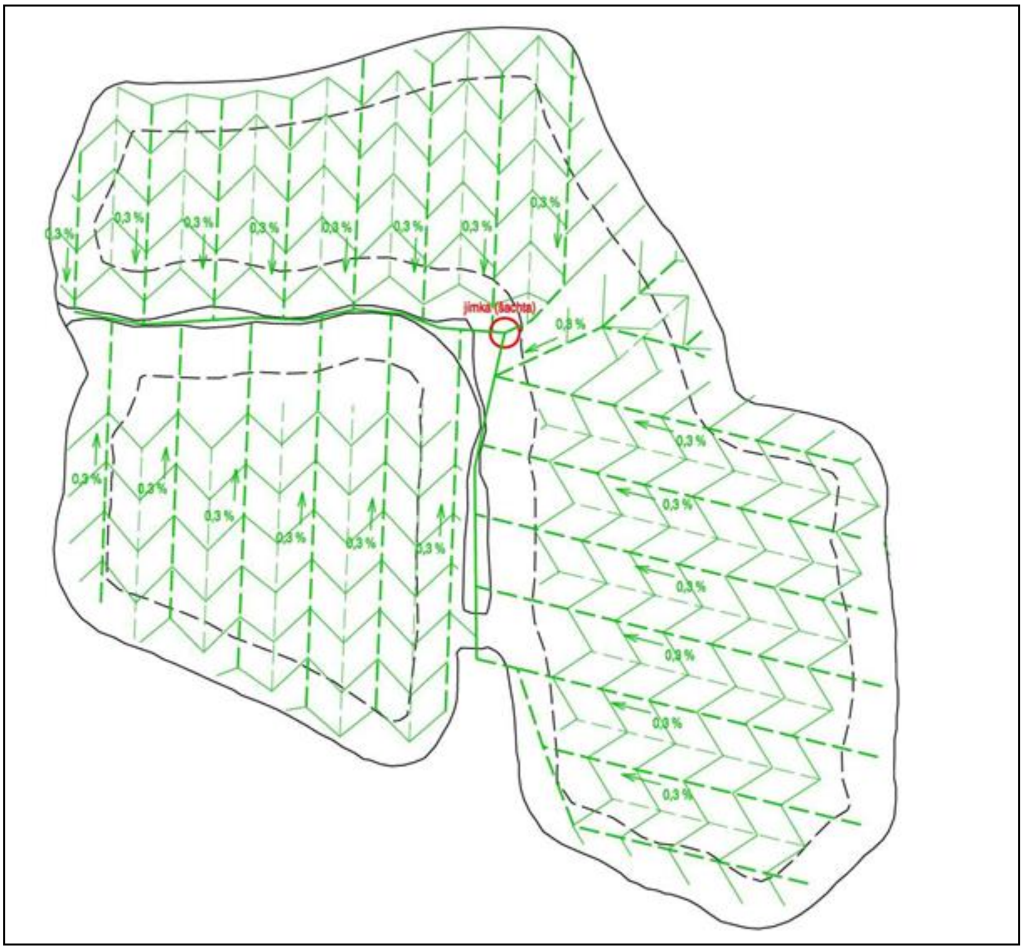


Explanatory notes:
Composition of drainage and insulation layers, from bottom up:
– terrain after the end of mining, settled according to the project
– aggregates or certified material
– geotextiles
– insulating foils
– drainage pipes, pipes, part of the drainage system
– landfill material

The slope of the drainage channels, the drainage system under the dumps will have a minimum gradient of 0.3%. The distance between the drainage channels will be at least 50 m.

The main drainage system will be used as an observation monitoring system for potential insulation breaches of newly built dumps.

Picture no. 47: Main drainage drainage system under mining waste disposal



Mining waste dumps will be insulated and sloped, so that water from its inner edges and surfaces accumulates in the water tank. The minimum surface gradient of dumps is 1 %. After the reclamation is completed, rainfall that falls on the reclaimed area will be drained to the center of the micro-basin to the water reservoir, which will normally function as a dry polder.

Water at the outer edges of the dumps will naturally be drained into ditches. Ditches will be built along the outer perimeter of the dumps. Shallow cuts with a gravel drainage layer are proposed, which will divert rainwater from the peripheral sides of the repository to the gravel-sand layer and naturally seepage.

Picture no. 48: Drainage Surface remediated area

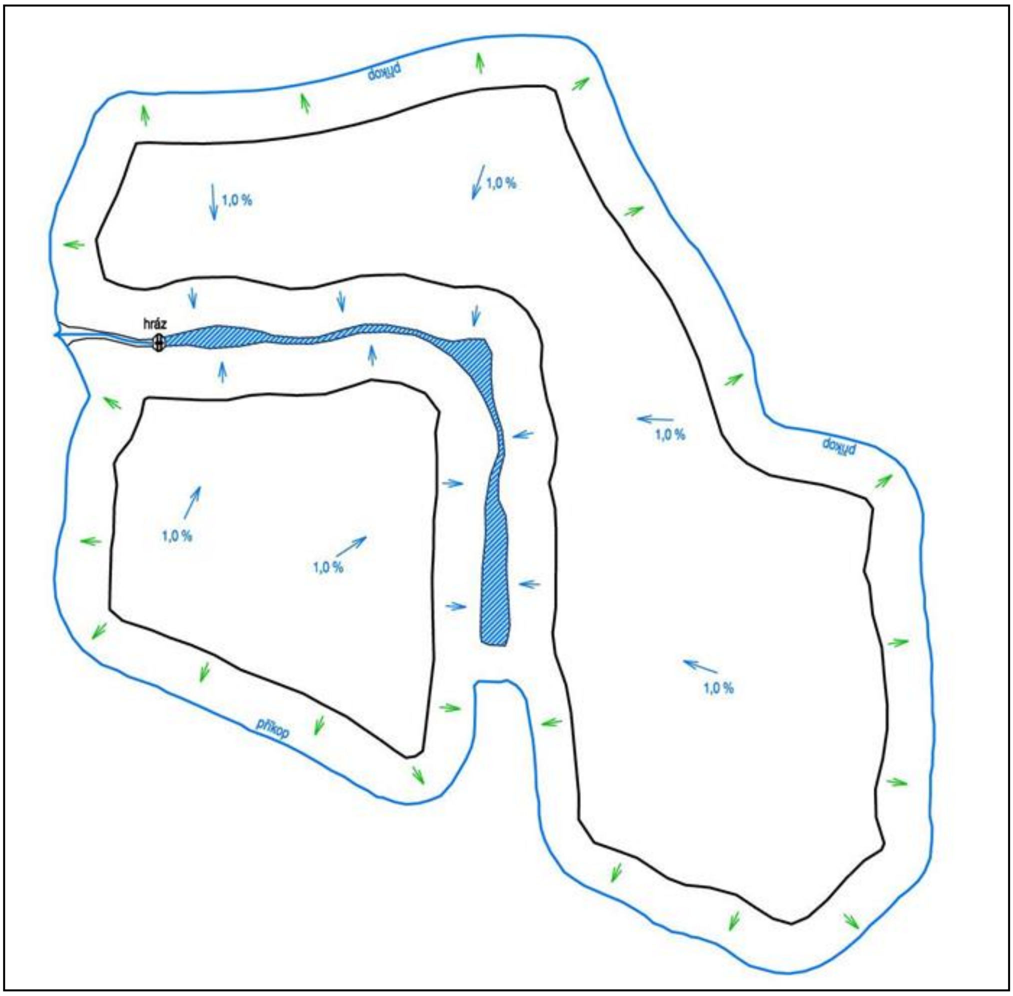


Table No. 65: Runoff of clean rainwater from the repository area after reclamation

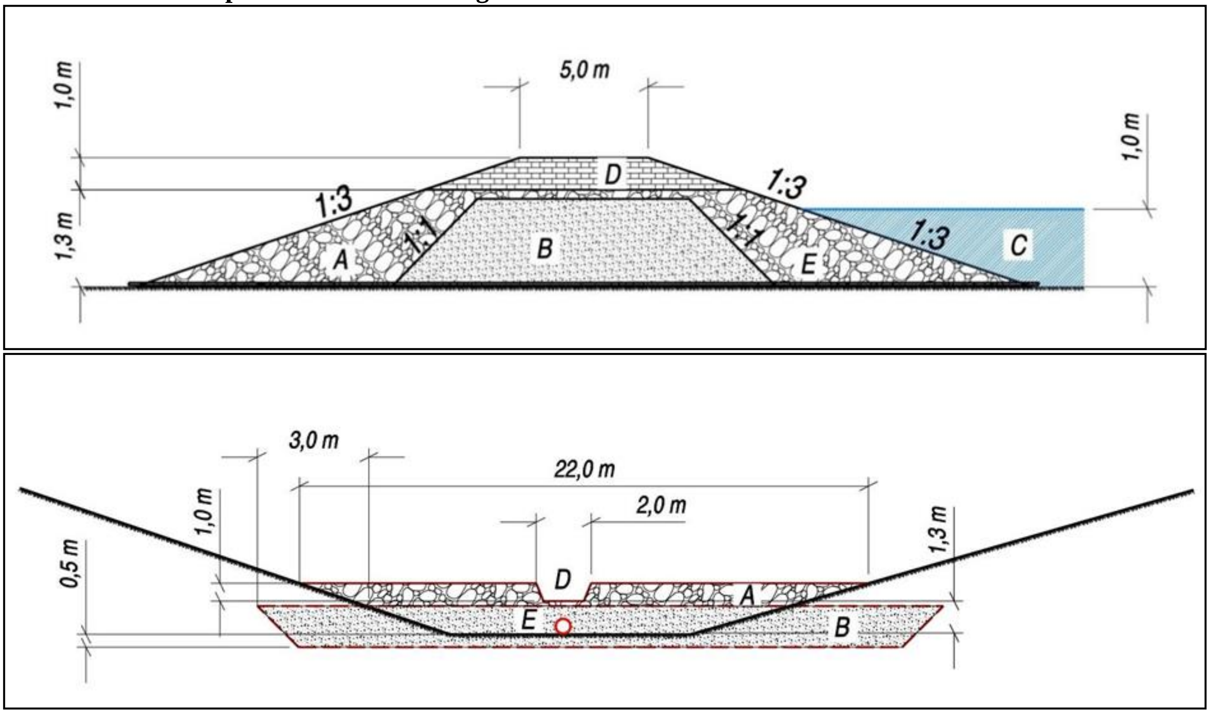
Oblast těžby a rekultivace		Vlhký rok			Průměrný rok			Design parametr
		Min	Průměr	Max	Min	Průměr	Max	
Západní vnější strana rekultivovaného úložiště								
Odtok z oblasti	m3/d	0.0	179.3	4,439.0	0.0	40.2	1,063.0	X [1)]
(plocha cca 55000 m^2)	l/s	0.0	2.1	51.4	0.0	0.5	12.3	53.7 l/s [3)]
Východní strana rekultivovaného úložiště								
Odtok z oblasti	m3/d	0.0	179.3	4,439.0	0.0	40.2	1,063.0	X [1)]
(plocha cca 57000 m^2)	l/s	0.0	2.1	51.4	0.0	0.5	12.3	53.7 l/s [3)]
Severní strana rekultivovaného úložiště								
Odtok z oblasti	m3/d	0.0	188.4	4,468.0	0.0	48.2	1,067.0	X [1)]
(plocha cca 112000 m^2)	l/s	0.0	2.2	51.7	0.0	0.6	12.3	100 l/s [3)]
Jižní rekultivovaného úložiště								
Odtok z oblasti	m3/d	0.0	179.3	4,439.0	0.0	40.2	1,063.0	X [1)]
(plocha cca 59000 m^2)	l/s	0.0	2.1	51.4	0.0	0.5	12.3	53.7 l/s [3)]
Plochy vyspádované do středu úložiště								
Odtok z oblasti	m3/d	0.8	1,429.1	22,202.0	0.0	352.8	7,374.0	17,000 m3 [2)]
(plocha cca 711000 m^2) [4)]	l/s	0.0	16.5	257.0	0.0	4.1	85.3	730 l/s [3)]
Zpevněné plochy/cesty a plochy bývalého zpracovatelského závodu [5)]								
Odtok z oblasti	m3/d	0.0	51.1	1,265.8	0.0	13.5	303.1	
(plocha cca 26000 m^2)	l/s	0.0	0.6	14.7	0.0	0.2	3.5	16.3

The design of the dam of the retention reservoir, or rather the dry polder, was based on the ČSN 75 2410 standard. The proposed dam of the retention reservoir will therefore have a slope on the inlet side of 1:3.0 and a slope on the air side of 1:3.0.

Parameters:

- Dam height: 2.3 m
- Safety spillway height: 1.0 m
- Crown height of the dam: 5.0 m
- slope of the sealing part of the dam: 1:1
- Maximum water level: 1.0 m
- slope of the stabilizing part of the dam: 1:3

Picture no. 49: Sample transverse and longitudinal section of the retention reservoir dam



Drainage of excess water from the retention reservoir will be solved by the lower drainage pipe and the safety spillway into the drainage ditch. The outlet of the drainage pipe will consist of pipe Ø ≈200 mm running under the dam body.

The maximum safe capacity of water trapped in the dry polder will be 17,000 m3 at a water height of up to 1.0 m. In this configuration, the retention capacity will be sufficient to retain 15 minutes of rain periodicity for 20 years (rain intensity 251 l/s/ha, inflow to the reservoir ≈19 m3/s, outflow ≈75 l/s). The maximum capacity of water captured in the dry polder will be at a total dam height of 2 m above the outlet level of 37,500 m3, where it will still be continuously passed through a safety spillway.

3. *Waste*

Wastes from land preparation

Mining part

Within the area of the DP (mining area) and the adjacent area north of the railway, there are practically no objects that will have to be removed before the overburden work begins. Unique objects (e.g. so-called water towers) will be demolished and waste will be classified according to the waste catalogue and will be handed over exclusively to facilities intended for handling the given type and category of waste.

Wood mass and other biomass (grass, leaves) will be used in a suitable way in the area of tailings for remediation and reclamation. For wood mass (including stumps), this means the need to chip it on site. Should part of this biological material be classified as waste, it will also be handed over to the appropriate facility for disposal or recovery. However, commercial use of wood mass as fuel is also possible.

Processing plant

As part of the preparation of the construction areas for the processing plant, it will first be necessary to demolish a number of existing buildings and then rough landscaping to the terrace levels. The demolition and earthmoving process is given in Part B.I.6. The method of carrying out demolition work and the inventory of the waste generated in terms of its quantity and type is the subject of a separate study, which also included a construction-technical survey with regard to the occurrence of asbestos. (Šarman, 2022)(Balvín, 2021)The construction of the manganese processing plant will take place on the territory of the former pyrite concentrate production plant, now the EP Chvaletice premises. Almost all existing buildings will be removed. Due to the long history of the site, the construction of the buildings is very different – monolithic concrete, prefabricated concrete panels, brick masonry, concrete skeleton/masonry, steel skeleton/masonry, sandwich panels, wood, etc. For this reason, it will be necessary to use a wide range of mechanization for demolition work and waste of various types will be generated.

One of the goals of demolition is to minimize waste generation and maximize the use of materials from demolition. Materials that are not usable in the next phase of the project (e.g. scrap metal or glass) or are waste (cables, asphalt strips, sandwich panels, etc.) will be handed over for recovery or disposal to facilities dedicated to the type and category of waste in question.

Clean construction debris will be crushed, sorted into fractions and the resulting recyclate will later be used as embankment and backfill material for the construction of the mining waste repository. Unpolluted excavated soil will also be used for the same purpose. The use is described in more detail in Part B.I.6. The use of 650,000 m3 of this material will significantly reduce the need to import materials for remediation and thus reduce the potential traffic burden. This is a significant change compared to the intention submitted to the screening procedure. Waste from demolitions and earthworks will therefore be handled in accordance with current waste legislation, i.e. Act No. 541/2020 Coll., on Waste and its implementing regulations. This material will be crushed and sorted into a form that will be used for remediation and reclamation of the space, at the same time its sampling will be carried out and compliance with the requirements for use for backfilling according to Decree No. 273/2021 Coll., on the details of waste management, will be verified. At the time of processing the documentation, a decree pursuant to § 8 par. 2) of the Waste Act, which will regulate the criteria for assessing compliance with the conditions for a by-product. It is therefore not possible to establish reliably whether demolition and earth-work material obtained on the construction site of the processing plant will be classified as waste or as by-product. If it is waste, it will be necessary to obtain a permit for the operation of a waste recovery facility in the reclamation area pursuant to Section 21 of the Waste Act. However, in terms of implementation technology as well as in terms of granulometry and quality of the materials used, the requirements will be identical in both cases.

In the area of the processing plant, trees will be removed in advance of the demolition work. Wood mass and other biomass (grass, leaves) can be used in a suitable way for remediation and reclamation. The handling of this material is therefore similar to that of mining. In the case of wood mass (including stumps), this means the need to chip it on site and transport it to the mining area for temporary deposit, ideally using a belt conveyor. Commercially usable wood will be transported by trucks. Should part of this biological material be classified as non-recoverable waste, it shall be handed over to a waste facility for disposal or recovery.

Table No. 66: Overview of waste from demolition of buildings on the premises of the processing plant

Code and categories	Name of waste according to Decree No. 8/2021 Coll., on waste catalogue	Quantity estimation (t)
17 01 01 O	Concrete	39 480
17 01 02 Or	Bricks	14 420
17 01 03 Or	Bags and ceramic products	209
17 01 07 Or	mixtures or separate fractions of concrete, bricks, tiles and ceramic products other than those mentioned in 17 01 06	1 290
17 02 01 Or	Wood	519
17 02 02 Or	Glass	19
17 03 01 N	Bituminous mixtures containing tar	292
17 04 05 Or	Iron and steel	2 172
17 04 07 Or	Mixed metals	415
17 05 04 Or	soil and stones other than those mentioned in 17 05 03	see above
17 06 01 N	Asbestos-containing insulation material	1
17 06 04 Or	insulation materials other than those mentioned in 17 06 01 and 17 06 03	761
17 06 05 N	Building materials containing asbestos	723
17 09 04 Or	mixed construction and demolition waste other than those mentioned in 17 09 01, 17 09 02 and 17 09 03	1 023

Construction wastes

During the construction of the quarry facilities and the processing plant, common construction waste from used building materials and technological units, packaging waste and waste of the nature of municipal waste is expected.

Statutory waste management is the responsibility of the building contractor (construction company), it is a standard procedure, and no problems can be expected in this respect. Waste will be sorted at the construction site and then handed over for disposal or use to waste management facilities, preferably waste recovery. During the construction, records will be kept on the amount and method of waste management, in accordance with Act No. 541/2020 Coll., on waste and its implementing regulations. The following table specifies the types of waste mainly generated during construction; the generation of other wastes is not excluded.

Table No. 537: Overview of waste from construction activities

Code and categories	Name of waste according to Decree No. 8/2021 Coll. About the waste catalogue
15 01 06 O	Mixed packaging
15 01 10 N	Packaging containing or contaminated with residues of dangerous substances
15 02 02 N	Absorbents, cleaning cloths and protective clothing contaminated with dangerous substances
16 06 01 N	Lead-acid batteries
17 01 01 Or	Concrete
17 01 02 Or	Bricks
17 01 07 Or	mixtures or separate fractions of concrete, bricks, tiles and ceramic products other than those mentioned in 17 01 06
17 02 01 Or	Wood
17 02 02 Or	Glass
17 02 03 Or	Plastics
17 03 02 Or	bituminous mixtures other than those mentioned in 17 03 01
17 04 05 Or	Iron and steel
17 04 11 Or	cables other than those mentioned in 17 04 10
17 05 04 Or	soil and stones other than those mentioned in 17 05 03
17 06 04 Or	insulation materials other than those mentioned in 17 06 01 and 17 06 03
17 08 02 Or	gypsum-based building materials other than those mentioned in 17 08 01
17 09 04 Or	mixed construction and demolition waste other than those mentioned in 17 09 01, 17 09 02 and 17 09 03
20 01 21 N	fluorescent lamps and other mercury-containing wastes
20 03 01 O	Mixed municipal waste
20 03 04	Sludge from septic tanks and cesspools (balancing of mobile toilets)

O	

Wastes arising from operation

Pursuant to Act No. 541/2020 Coll., on Waste, mining waste is exempt from the scope of this Act to the extent that its management is regulated by other legal regulations. Another legal regulation in this case is Act No. 157/2009 Coll., on Mining Waste Management. According to Act No. 157/2009 Coll., mining waste means waste that the operator disposes of or has the intention or obligation to dispose of, and which is generated during mineral exploration, mining, treatment or storage and which, according to the Waste Act, belongs to waste from mining or mineral treatment. In case of doubt as to whether it is mining waste under this Act, the Czech Mining Authority shall decide, after consultation with the central state administration body concerned, on the proposal of the waste producer or on its own initiative.

In accordance with the above provision, the investor requested the opinion of the CBU, which issued its opinion on 10.7.2019, under ref. SBS20517/2019/CBU-21. That opinion states: "*Based on your application, registered at the CBU under ref. SBS 20517/2019 of 10 June 2019, the Czech Mining Authority in Prague (hereinafter referred to as the "CBU") informs you that the materials that will be created during the planned mining and modification of the exclusive deposit Chvaletice-tailings* ponds *1,2 and the exclusive deposit Řečany-tailings* pond *3, non-magnetic residues (residues from the first stage of treatment) and residues from leaching – puddle (residues from the second stage of treatment) will be mining waste, within the meaning of § 2 para. 1 of Act No. 157/2009 Coll., on Mining Waste Management and on Amendments to Some Acts, as amended (hereinafter referred to as the "Mining Waste Act"). The CBU decides whether it is mining waste or not only in case of doubt, which did not occur in the case in question with regard to the wording of Section 2 para. 1 point. a) of the Mining Waste Act, and therefore communicates the above to the application*.". This waste is the output of the raw material processing process and at the same time an input for remediation and reclamation. Therefore, its properties are listed in Chapter 2.1.6. Part of the mining work is also overburden, i.e. removal of non-humic and humic material covering the tailings, eventually forming its slopes. These materials will be stored as part of remediation and reclamation and used for the final modelling of the dumps. It will not be mining waste or general waste. Before overburden is carried out at this tailings, more detailed sampling will be carried out and if material that could not be suitably used for reclamation is found, this material will be classified according to the waste catalogue and handed over as waste to an authorized person for disposal or use.

Mining waste will be transported from the processing plant to the mining area to the plat feet storage by a closed belt conveyor. The storage capacity of mining waste is 5 days of operation (~ 12 000 t). This part of the hall is enclosed and has an impermeable bottom, and therefore the material cannot contaminate water and soil. Mining waste from the hall will be loaded by a horizontal loader onto trucks and thus transported to the mining waste repository. Mining waste has an average humidity of about 18-20% and therefore its handling is dust-free. This material is further characterised in Chapter B.II.7 as it serves as an input in the overall process.

Table No. 54: Mining waste deposited back at the repository

Output	Origin	Amount t/year	Method of loading
Non-magnetic fraction	Magnetic separation	approx. 660,000	re-disposal in the mining area as mining waste

Solid leach residue	Leaching	approx. 580,000	re-disposal in the mining area as mining waste

In addition to wastes from magnetic separation and leaching processes, other wastes from individual sub-processes will be generated (see Table 61). Some of these wastes will be classified as by-products.

The normal operation of the processing plant and mining facilities will generate other wastes, such as waste packaging from group 15, municipal waste group 20 and waste associated with the operation and maintenance of facilities, buildings and mechanization, including hazardous waste.

All waste will be handled in accordance with legal requirements, i.e. in accordance with Act No. 541/2020 Coll., on Waste and its implementing legal regulations. Waste will be separately collected and sorted, and all non-recoverable waste will be handed over to a waste facility for disposal or recovery.

Table No. 559: Wastes arising from the operation of a processing plant (excluding mining wastes)

Code and category	Name of waste according to Decree No. 8/2021 Coll., on waste catalogue	Outputs	Origin	Amount t/year	Method of loading
11 02 07 N	Other wastes containing dangerous substances	Solid residue from purification	Purification	max. 1 250	Handover to a facility for disposal
		Used activated carbon	Purification	max. 2 200	Handover to a facility for disposal
		Anode sludges (MnO2)	Electrowinnig	max. 6 400	The intention is to classify as a by-product or to be sent to a facility for disposal
		Solid residue from heavy metal removal from MSM	Production of MSM	max. 1,400	Delivery to a facility for recovery or disposal
		Solid residue from removing iron from MSM	Production of MSM	1 000	Handover to a facility for disposal
		Filtration materials - tarpaulins	Dewatering (NMT, LR, ammonia regeneration, Mg removal, purification)	c. 150	Delivery to a facility for recovery or disposal
11 02 99 O	wastes not otherwise specified	Solid residue from removal Mg	Mg removal	max. 65 000	The intention is to classify as a by-product

Code and category	Name of waste according to Decree No. 8/2021 Coll., on waste catalogue	Outputs	Origin	Amount t/year	Method of loading
		Gypsum from ammonia regeneration	Ammonia regeneration	approx. 120,000	The intention is to classify as a by-product
13 01 13 N	Other hydraulic oils	Other hydraulic oils	Operation of the plant and mining	approx. 120,000	Handover to a facility for disposal
13 02 08 N	Other engine, gear and lubricating oils	Other engine, gear and lubricating oils	Operation of the plant and mining	approx. 24	Handover to a facility for disposal
13 05 07 N	Oily water from oil separators	Oily water from oil separators	Plant operation	approx. 1	Handover to a facility for disposal
13 05 08 N	Mixtures of sand trap wastes and oil separators	Mixtures of sand trap wastes and oil separators	Plant operation	approx. 24	Handover to a facility for disposal
15 01 01 O	Packaging - paper and cardboard	Packaging - paper and cardboard	Operation of the plant and mining	approx. 24	Delivery to a facility for recovery or disposal
15 01 02 O	Packagings, plastic	Plastic packaging (drums, foils, etc.)	Operation of the plant and mining	approx. 60	Delivery to a facility for recovery or disposal
15 01 03 O	Wooden packaging	Wooden packaging (pallets, etc.)	Plant operation	c. 150	handing over to a facility for recovery or disposal, EURO pallets will be put back into circulation
15 01 04 O	Metal packaging	Metal packaging (drums, etc.)	Plant operation	approx. 60	Delivery to a facility for recovery or disposal
15 01 06 O	Mixed packaging	Mixed packaging	Operation of the plant and mining	approx. 10	Delivery to a facility for recovery or disposal
15 01 07 O	Glass containers	Glass containers	Operation of the plant and mining	approx. 60	Delivery to a facility for recovery or disposal
15 01 10 N	Packaging containing or contaminated with residues of dangerous substances	Packaging containing residues of dangerous substances	Operation of the plant and mining	approx. 36	Delivery to a facility for recovery or disposal

Code and category	Name of waste according to Decree No. 8/2021 Coll., on waste catalogue	Outputs	Origin	Amount t/year	Method of loading
15 02 02 N	Absorbents, filter materials (including oil filters not otherwise specified), cleaning cloths and protective clothing contaminated	Absorbents, cleaning materials	Operation of the plant and mining	approx. 60	Handover to a facility for disposal
19 08 05 O	sludges from municipal wastewater treatment	Sewage sludge	Sewage treatment	c. 110	Handover to a facility for disposal or use for reclamation of the repository
19 08 09 O	Grease and oil mixture from the fat separator containing only edible oils and edible fats	Grease and oil mixture from the fat separator containing only edible oils and edible fats	Plant operation	max. 2	Handover to a facility for disposal
19 08 13 N	sludges from other industrial wastewater treatment operations	sludges from industrial wastewater treatment plants	Industrial wastewater treatment	approx. 200	Handover to a facility for disposal
20 01 01 O	Paper and paperboard	Paper and paperboard	Operation of the plant and mining	approx. 12	Delivery to a facility for recovery or disposal
20 01 39 O	Plastics	Plastics	Operation of the plant and mining	approx. 12	Delivery to a facility for recovery or disposal
20 01 40 O	Metals	Metals	Plant operation	max. 100	Delivery to a facility for recovery or disposal
20 01 02 O	Glass	Glass	Operation of the plant and mining	approx. 12	Delivery to a facility for recovery or disposal
20 03 01 O	Mixed municipal waste	Mixed municipal waste	Plant operation	approx. 50	Handover to a facility for disposal
20 03 03 O	Street sweeps	Street sweeps	Operation of the plant and mining	approx. 10	Handover to a facility for disposal

Code and category	Name of waste according to Decree No. 8/2021 Coll., on waste catalogue	Outputs	Origin	Amount t/year	Method of loading
		Electrical waste	Plant operation	max. 6	will be passed on as part of the take-back

The intention of the investor is, inter alia, to classify some of the waste generated during the operation of the processing plant as a by-product of the raw material processing process. This includes, for example, the output from the removal of magnesium (MgCO3), which is expected to be used, for example, in agriculture, in the production of fertilizers. It is also gypsum (formed during ammonia regeneration) and anode sludge MnO2 (formed during electrowinnig). A more detailed description of these by-products is given in Chapter B.III.5 — Production products.

Waste likely to be generated in an accident

Waste that could be generated in the event of accidents is mainly represented by leaks of fuels and lubricants from means of transport and mechanization during their failures and accidents. This is mainly the area of mining. Emergency situations may generate waste, of which hazardous waste containing oil substances is the most serious in terms of influencing the environment. If the soil is contaminated, it will be immediately excavated and treated as hazardous waste, preferably taken to the decontamination area for cleaning.

A situation in which an accident would occur, and waste would arise in connection with it will be dealt with by an emergency plan prepared in accordance with applicable law, in particular with the provisions of Part IV. Decree ČBÚ No. 26/1989 Coll. and No. 51/1989 Coll. as amended. Part of the emergency plan will also be a plan of measures in the event of an oil spill prepared on the basis of § 39 para. 2- Act No. 254/2001 Coll. on water and amending certain acts.

Waste may be generated in the plant area when some raw materials or intermediates leak or when some part of the technological equipment or building is damaged. However, the risk of leakage of any chemicals is minimized by the technological solution. All risks will also be minimized by emergency plans prepared in accordance with the relevant regulations and approved by the competent authorities. Any emergency waste would be classified according to its actual characteristics and handed over to a waste facility.

4. Other emissions and residues

Noise

An acoustic study was prepared to identify the sources of noise and to calculate the noise burden of the project, which is Annex No. 1 to this documentation. This acoustic study was substantially updated and reworked in addition to the revised documentation, taking into account the requirements of the public health protection authority – the Regional Hygiene Station of the Pardubice Region (see Introduction).(Králíček, 2023)

In particular, the updated acoustic study includes the re-evaluated and updated acoustic parameters of the plant's equipment according to the project documentation for the zoning decision (DUR), which specifies the parameters of the plant's equipment (TRACTEBEL ENGINEERING a.s., from 06/2023). The computational model is therefore updated, acoustic modifications of individual devices are proposed and increased sound insulation of buildings in the area of the processing plant and mining area is proposed. Modifications to the plan are clearly listed in section 10.2 at the end of the acoustic study.

Within this chapter, the individual sources of noise in the area of the project and the values of noise emissions caused by these sources are listed and described in the text. For more information regarding noise, please refer to Sections C and D of this documentation.

Hygienic noise limits

Hygienic noise limits are determined by Government Regulation No. 272/2011 Coll., on Health Protection against the Adverse Effects of Noise and Vibrations, effective from 1.7.2023.

According to § 12 *"Hygienic Noise Limits in Protected Outdoor Areas of Buildings and in Protected Outdoor Areas", the* determining noise indicator (with the exception of high-energy impulse noise) is the equivalent sound pressure level A $L_{Aeq,T}$. This is the case of the project area, where the dominant source of noise is traffic on the surrounding road network (car and rail traffic) and noise from sources in industrial areas in the area.

Note:
**... The protected outdoor space of buildings is understood to be an area up to 2 m in front of a part of their external cladding, significant from the point of view of the penetration of noise from the outside into the protected interior space of apartment buildings, family houses, ... 'An area significant for the penetration of noise is the area in front of the opening of the building envelope ensuring direct natural ventilation, behind which the protected interior of the building is located, unless this space can be directly ventilated in any other way.'*
***... Protected outdoor space means undeveloped land that is used for recreation, ... with the exception of forest and agricultural land and outdoor workplaces.*

An analysis of the hygienic noise limits according to § 12 and Annex No. 3 of the above-mentioned Government Regulation for the area of the project is given in the acoustic study (Annex No. 1 of the documentation).

Noise sources

The noise sources in the project area are listed in the acoustic study (Králíček, 2023) in chapters 5.3.2. and 5.3.3.

In terms of location within the project, noise sources can be defined as follows:

- Construction noise
- Noise from the mining area
- Noise from the operation of the processing plant
- Traffic noise

These sources are described in more detail in subchapters a) – c) below.

Sources of noise from the construction of the project

Construction activities and the mechanization used will also be a source of noise during the construction of the project. An overview of the construction site mechanisms used, their numbers, duration of use and equivalent sound pressure levels are given in the table (**Chyba! Chybný odkaz na záložku.**). The individual phases of the project construction and the mechanisms used are described in detail in Chapter B.I.6.

Table No. 56: Sources of noise from the construction of the project

Stage (area)	Technological phase:	Site mechanism name	$L_{Aeq,T\text{-}10m}$ (dB) L_{WA} (dB)	Number	Usage h/day
1 (Plant)	Deforestation	Harvestor	78	1	8
		Truck-hauling logs	90* (L_{ASEL}-7,5m)	6	20 rides
		Chipper	78	1	8
		Loader with hydraulic arm for chipper	75	1	8
		Wheel loader	75	1	6
		Dump truck	90* (L_{ASEL}-7,5m)	1	20 rides
		Chainsaws	80	2	6
2 (Mining)	Deforestation	Harvestor	78	1	8
		Chipper	78	1	8
		Loader with hydraulic arm for chipper	75	1	8
		Wheel loader	76	1	6
		Dump truck	90* (L_{ASEL}-7,5m)	1	40 rides
		Chainsaws	80	2	6
3 (Plant)	Relocation of utility networks	Tractor digger	75	1	8
		Small horizontal loader	74	1	8
		Truck	90* (L_{ASEL}-7,5m)	1	40 rides
		Concrete/asphalt cutter	80	1	6
		Equipment for earth extrusion	76	1	6
		Small machinery and hand tools	≤75	10	8
4 (Technological bridge)	Construction + installation	Drilling unit	78	1	10
		Horizontal loader	L_{WA} = 107	1	8
		Truck	90* (L_{ASEL}-7,5m)	1	30 rides
		Concrete mixer	72	1	
		Crane	65	01.2	8
		High lift platform	72	01.2	8
		Small machinery and hand tools	≤75	20	8
5 (Plant)	Building demolition	Hydraulic excavator	80	2	8
		Hydraulic shears	L_{WA} = 116	2	8
		Hydraulic hammer	L_{WA} = 120	2	8
		Bulldozer	L_{WA} = 106	1	8
		Horizontal loader	L_{WA} = 107	3	8
		Mobile crane	75	2	8
		Forklift platform	72	4	8

		Truck-waste removal	90* (L_{ASEL}-7,5m)	3	80 rides
		Truck-interreal transport	90* (L_{ASEL}-7,5m)	2	80 rides
		Construction debris recycling unit	L_{WA} = 120	01.2	8
		Small machinery and hand tools	≤75	30	8
6 (Plant)	Field work (grading, compaction, foundation, site preparation)	Hydraulic excavator	80	2	8
		Hydraulic hammer	L_{WA} = 120	2	8
		Bulldozer	L_{WA} = 106	2	8
		Horizontal loader	L_{WA} = 107	3	8
		Truck-interreal transport	90* (L_{ASEL}-7,5m)	3	80 rides
		Truck-material delivery	90* (L_{ASEL}-7,5m)	1	80 rides
		Construction debris recycling unit	L_{WA} = 120	2	8
		Drilling rig	83	1	8
		Concrete mixer	72	1	8
		Small machinery and hand tools	≤75	20	8
7 (Mining facilities and washing station)	Field work (grading, compaction, foundation, site preparation)	Bulldozer with ripper	L_{WA} = 106	1	10
		Horizontal loader	L_{WA} = 107	1	10
		Truck	90* (L_{ASEL}-7,5m)	1	40 rides
8 (Mesideponia and mining)	Fieldwork	Horizontal loader	L_{WA} = 107	1	10
		Bulldozer	L_{WA} = 106	1	10
		Articulated dumper	L_{WA} = 110	1	80 rides
9 (Railway siding - Plant)	Phase A: Earthworks and construction of the railway substructure	Hydraulic excavator	80	2	8
		Bulldozer	L_{WA} = 106	1	8
		Horizontal loader	L_{WA} = 107	2	8
		Truck	90* (L_{ASEL}-7,5m)	4	80 rides
		Grejdr	L_{WA} = 106	1	8
		Roller	76	1	8
		Small machinery and hand tools	≤75	20	8
		Bulldozer	L_{WA} = 106	1	8

	Phase B: Installation of Railway Superstructure	Horizontal loader	L_{WA} = 107	2	8
		Truck	90* (L_{ASEL}-7,5m)	8	80 rides
		Grejdr	L_{WA} = 106	1	8
		Roller	76	1	8
		Crane	65	2	8
		Tamping machine	75	1	8
		Small machinery and hand tools	≤75	20	8
	Phase C: Installation of control and safety systems, connection to the Seven siding	Forklift platform	72	1	8
		Small machinery and hand tools	≤75	20	8
10 (Plant construction)	**Phase A:** Construction of foundations and rough construction of buildings	Hydraulic excavator	80	5	10
		Bulldozer	L_{WA} = 106	2	10
		Vibratory roller	80	1	8
		Horizontal loader	L_{WA} = 107	2	10
		Mud pump (e.g. KDFU 80 Wacker) for pumping groundwater and rainwater (the pump is submerged in water in a sump at the bottom of the construction pit).	Free on the field 65 dB When immersed in water in a sump 48 dB	12	Can be up to 24 h/day
		Truck-internal transport	90* (L_{ASEL}-7,5m)	3	100 rides
		Truck	90* (L_{ASEL}-7,5m)	10	100 rides
		Concrete mixer	72	5	10
		Drilling rig	83	1	12
		Mobile crane	75	2	8
		Tower crane	65	5	12
		Mobile platform	72	5	12
		Concrete pumping system	70	1	10
		Small machinery and hand tools	≤75	60	10
	Phase B: Installation of building envelope and roofs, final construction work	Hydraulic light excavator	78	2	10
		Vibratory roller	80	1	8
		Horizontal loader	L_{WA} = 107	2	10
		Truck-internal transport	90* (L_{ASEL}-7,5m)	3	100 rides

		Truck	90* (L_{ASEL}-7,5m)	10	100 rides
		Concrete mixer	72	2	10
		Mobile crane	75	3	8
		Tower crane	65	2	12
		Mobile outdoor platform	72	13	12
		Small machinery and hand tools	≤75	60	10
	Phase C: Installation of internal networks and wiring, installation and connection of technological equipment, final exterior works	Vibratory roller	80	1	8
		Horizontal loader	L_{WA} = 107	2	10
		Truck-indoor transport	90* (L_{ASEL}-7,5m)	3	100 rides
		Truck	90* (L_{ASEL}-7,5m)	10	100 rides
		Mobile crane	75	5	8
		Tower crane	65	1	12
		Mobile outdoor platform	72	7	12
		Grejdr	L_{WA} = 106	1	12
		Finisher	78	1	12
		Roller	76	1	12
		Small machinery and hand tools	≤75	60	12
11 (Construction of the pulping hall and quarry facilities)	**Phase A:** Foundation construction and rough construction of the pulping hall+accessories, rough construction of the quarry buildings	Hydraulic excavator	80	1	10
		Bulldozer	L_{WA} = 106	1	10
		Horizontal loader	L_{WA} = 107	1	10
		Truck-internal transport	90* (L_{ASEL}-7,5m)	1	40 rides
		Truck	90* (L_{ASEL}-7,5m)	1	40 rides
		Concrete mixer	72	2	10
		Drilling rig	83	1	12

		Sump pump (e.g. KDFU 80 Wacker) for pumping groundwater and rainwater (the pump is submerged in water in a sump at the bottom of the construction pit).	Freely on the ground 65 dB	2	Can be up to 24 h/day
			When immersed in water in a sump 48 dB		
		Mobile crane	75	1	8
		Tower crane	65	1	12
		Mobile platform	72	2	12
		Concrete pumping system	70	1	10
		Small machinery and hand tools	≤75	20	10
	Phase B: Installation of building envelope and roofs, final construction work	Hydraulic excavator light	78	1	10
		Horizontal loader	L_{WA} = 107	1	8
		Truck-internal transport	90* (L_{ASEL}-7,5m)	1	40 rides
		Truck	90* (L_{ASEL}-7,5m)	5	40 rides
		Concrete mixer	72	1	12
		Mobile crane	75	1	10
		Mobile outdoor platform	72	3	12
		Small machinery and hand tools	≤75	20	12
	Phase C: Installation of internal networks and wiring, installation and connection of technological equipment, final exterior works	Vibrating roller	80	1	8
		Horizontal loader	L_{WA} = 107	1	10
		Truck-internal transport	90* (L_{ASEL}-7,5m)	1	40 rides

		Truck	90* (L_{ASEL}-7,5m)	2	40 rides
		Grejdr	L_{WA} = 106	1	12
		Finisher	78	1	12
		Roller	76	1	12
		Small machinery and hand tools	≤75	20	12
12 (Construction of an access road to the mining area and the first part of the mining waste repository)	Field work (levelling, compaction, foundation)	Hydraulic excavator	80	1	8
		Horizontal loader	L_{WA} = 107	1	8
		Truck-internal transport	90* (L_{ASEL}-7,5m)	2	40 rides
		Truck	90* (L_{ASEL}-7,5m)	2	40 rides
		Grejdr	L_{WA} = 106	1	12
		Vibratory roller	80	1	12
		Small machinery and hand tools	≤75	20	12

Explanatory notes:
$L_{Aeq,T}$ = equivalent sound pressure level A
L_{WA} = total sound power level

**Note:*
The L_{ASEL} (noise exposure level) noise level of a single pass is the total equivalent sound pressure level A from the passage combined into a time interval of 1 s. The value was determined for a reference point distance of 7.5 m and a speed of 15 km/h (including take-off). This cycle can be considered as driving around the construction site and going to the adjacent access road. In the case of driving on main roads at a speed of 50 km/h (II/322), the L_{ASEL} value will be 3 dB higher – estimated based on measurements.

Sources of noise from the mining area

Sources of noise in the mining area will be machines and equipment in buildings in the background of the quarry (see **Chyba! Chybný odkaz na záložku.**) as well as mechanization, which will be used in the extraction and handling of raw materials and in remediation and reclamation works. An overview of the individual types of mechanization used in the mining area and the sound power level A (LWA) is given in the following text:

1. *Mechanization for mining operations:*
   2x excavators (CAT374F) – **L_{WA} = 106 dB**
   4x articulated dumper (CAT745) - **L_{WA} = 110 dB**
2. *Mechanization for subsequent remediation works and for the creation of mining waste dumps:*
   2x wheel front loader (CAT972M) - **L_{WA} = 107 dB**
   3x dozer (CATD6N) - **L_{WA} = 107 dB**
   The material will be weighed in by dumpers, which will also take away the excavated material.
3. *Auxiliary mechanization for both processes (mining and remediation):*
   1x grader (CAT160) - **L_{WA} = 106 dB**

1x vibratory roller (CATCP12) - **L_{WA} = 107 dB**
Sprinkler truck - **L_{WA} ≤ 105 dB**
other mechanization (forklift in the workshop, truck, service van, fuel tank) - **L_{WA} ≤ 100 dB**

According to Government Order No. 272/2011 Coll., on protection against the adverse effects of noise and vibrations, the noise level during the daytime is determined for 8 continuous and consecutive noisiest hours (LAeg, 8h). The concurrence of mechanisms in the mining area during continuous operation for the 8 noisiest hours of the day is as follows:
2 x excavator (CAT374FL) - **L_{WA} = 106 dB/excavator**
1x dozer (CATD6N) - **L_{WA} = 107 dB**
100 articulated dumper cycles (CAT745) - **L_{WA} = 110 dB** (100 excavated material runs + 100 remediation runs)
The operating time of the mechanisms is 7 hours for an eight-hour work Shift.

Table No. 57: Sources of noise in buildings and equipment in the background of the quarry

<table>
<tr><th rowspan="2">Designation of the object, device:</th><th rowspan="2">Name of the object, device:</th><th colspan="3">Noise sources:</th><th rowspan="2">Requirements for soundproofing the noise source</th><th rowspan="2">Calculated avg. noise inside the hall, LpA-INT [dB] / Ventilation requirements Requirements for the design of the Obj. – min. Rw values (dB) outdoors coats</th></tr>
<tr><th>Title</th><th>Location</th><th>LpA-1 m [dB](alt. LW,A)</th></tr>
<tr><td rowspan="6">01</td><td rowspan="6">Quarry background , natural ventilation</td><td>Workshop for maintenance of mobile equipment in the mining sector. Various hand tools.</td><td>I</td><td>80</td><td>DAY only operation</td><td rowspan="6">≤75 / Exterior cladding, including windows – Rw ≥ 32 dB</td></tr>
<tr><td rowspan="2">Mobile compressors 1-3</td><td rowspan="2">I</td><td rowspan="2">100</td><td>Akust. Cover or silencer ΔLA = 30 dB.</td></tr>
<tr><td>Reduce noise to ≤70 dB/1m.</td></tr>
<tr><td>Washing bay for mobile equipment</td><td>I</td><td>85</td><td>DAY only operation</td></tr>
<tr><td>Ceiling fan for air conditioning workshops No. 1-4</td><td>I/O</td><td>55</td><td>Akust. Cover or silencer ΔLA = 10 dB Reduce noise to ≤45 dB/1m.</td></tr>
<tr><td>Side axial fan for changing rooms and showers, air conditioning, No. 1-6</td><td>I/O</td><td>45</td><td>-</td></tr>
</table>

		Office Side Axial Fan No. 1-4	I/O	45	-	
	Raw material storage and raw material melting**, natural ventilation**	**Centrifugal pump of mine water storage tank No. 1 and 2**	O	86	Akust. Cover or silencer ΔLA = 25 dB Reduce noise to ≤61 dB/1m.	**For DEN 85 dB For NIGHT 82 dB** **Forced ventilation for NOC /** Walls+windows: R´w ≥ 45 dB (windows ≤ 35% of the wall area) Ceiling (roof): R´w ≥ 40 dB Roof skylights: R´w ≥ 45 dB (strip in the centre of the hall, width 5 m, height 3.5 m)
		Submersible pump of the handling area sump	O	65	-	
		Feed centrifugal mine water pump No. 1 and 2	O	86	Akust. Cover or silencer ΔLA = 25 dB Reduce noise to ≤61 dB/1m.	
		Raw Material Hopper	I/O	85	DAY only operation	
		Plate conveyor	I	80	-	
		Pocket conveyor of raw material No. 1 and 2	I	80	-	
		Raw Material Distribution Belt Conveyors No. 1-4	I	80	-	
		Pocket conveyor of raw material for pulping	I	80	-	
		Wet Rotary Screen No. 1 & 2	I	90	Akust. Cover or silencer ΔLA = 10 dB Reduce noise to ≤80 dB/1m.	
		Pulping Tanks 1-4	I	86	Akust. Cover or silencer ΔLA = 10 dB Reduce noise to ≤76 dB/1m.	
		Magnetic separation slurry pump No. 1-4	I	90	Akust. Cover or silencer ΔLA = 14 dB Reduce noise to ≤76 dB/1m.	
		Distribution belt conveyors of residues No. 1-4	I	80	-	
		Mobile Loader	I	90	-	

Explanatory notes:

1. **xxx** - *indicates a device that will not be operated in parallel, but serves as a backup (i.e. only one of the two pumps will always be in operation)*
2. *LpA-1 m - sound pressure level A 1 m from the source contour, measured in a free acoustic field*
3. *LW,A - total sound power level A*
4. *LpA-INT – calculated average equivalent sound pressure level A inside the hall, 2 m from the interior façade*
5. *RW – Weighted Laboratory Sound Insulation of Construction*
6. *ΔLA = Reduction of the total sound power level A, or pressure A at a given point, by means of a damper or acoustic cover.*
7. *Location I = indoors, O = outdoors, I/O = for fans (fan inside, air is taken from the hall)*

Sources of noise from the processing plant

On the premises of the processing plant, individual devices will be used as sources of noise. A list of these noise sources, their name, location, noise pressure value and noiseproofing requirements are given in the following table (Table No. 58).

Table No. 58: Noise Sources in a Processing Plant

Explanatory notes:

- **xxx** - *indicates a device that will not be operated in parallel, but serves as a backup (i.e. only one of the 2 pumps will always be in operation)*
- *LpA-1 m - sound pressure level A 1 m from the source contour, measured in a free acoustic field*
- *LW,A - total sound power level A*
- *LpA-INT – calculated average equivalent sound pressure level A inside the hall, 2 m from the interior façade*
- *RW – Weighted Laboratory Sound Insulation of the Structure*
- *R´w = weighted STRUCTURAL sound insulation of the structure (requirement after measurement on the construction site).*
- *ΔLA = Reduction of the total sound power level A, or pressure A at a given point, by means of a damper or acoustic cover.*
- *Location I = indoors, O = outdoors, I/O = for fans (fan inside, air is taken from the hall)*

Designation of the object, device:	Name of the object, device:	Noise sources:			Requirements for soundproofing the noise source	Designation of the object, device:	Requirements for the construction of the building - minimum R´w values (dB) of the external envelope:
		Title	Location	LpA-1 m [dB]		L_{pA-INT} [dB]	
2	Magnetic separation	Wet Rotary Screen No.1 & 2	I	90	2	**86 Forced ventilation for NIGHT**	**Walls+windows:** R´w ≥ 45 dB (windows ≤ 35% of wall area) **Ceiling (roof):** R´w ≥ 40 dB
		Magnetic separator No. 1 and 2 for the first stage of separation	I	85	-		
		Magnetic separator for the second stage of separation	I	85	-		
		Centrifugal slurry pump No. 1 and 2 for the first stage of separation	I	74	-		
		Centrifugal pump of concentrate slurry No. 1 and 2 of the first separation stage	I	74	-		
		Centrifugal pump of tailings suspension No. 1 and 2 of the first separation stage	I	76			
		Centrifugal pump of concentrate slurry No. 1 and 2 of the second separation stage	I	76	-		
		Centrifugal pump of tailings suspension No. 1 and 2 of the second separation stage	I	76	-		
		Submersible pump 1 and 2 sedimentation tank	I	60	-		
		Centrifugal fan No. 1-4	O	73	Acoustic cover or silencer**ΔL_A = 20 dB**		

			(roof of building 2)		Reduce noise to ≤53 dB/1m.		
3	Concentrate storage and concentrate flushing	Concentrate sedimentation agent	O (at Z façade art. 3)	75	Akust. Cover or silencer **ΔLA = 20 dB** Reduce noise to ≤55 dB/1m.	**86 Forced ventilation for NIGHT**	**Walls+windows:** R´w ≥ 45 dB (windows ≤ 35% of wall area) **Ceiling (roof):** R´w ≥ 40 dB **Roof skylights:** Rw ≥ 45 dB (centre hall strip, 4 m wide)
		Centrifugal slurry pump No. 1 and 2	**O, under the sedimentation tank**	76	Akust. Cover or silencer **ΔA = 15 dB** Reduce noise to ≤61 dB/1m.		
		Centrifugal fan No. 1-4	**O, roof of building 3**	73	Akust. Cover or silencer **ΔL = 20 dB** Reduce noise to ≤53 dB/1m.		
		Stirred Tray	I	82	-		
		Concentrate filter press No. 1-4	I	70	-		
		Conveyor belt No. 1-4	I	70	-		
		Centrifugal pump for concentrate suspension into filter presses No. 1 and 2	I	83	-		
		Centrifugal filtrate pump for sedimentation tank No. 1 and 2	I	76	-		
		Centrifugal water pump for filter presses No. 1-4	I	76	-		
		Submersible pump	I	76	-		
		Mixed tray No. 1-4	I	73	-		
		Centrifugal slurry pump No. 1-4	I	76	2 in use		
		Fan	I	73	After damping (install a silencer on the exhalation)		
		Hall air temperature control system (classic Sahara in the hall)	I	65	-		
4	Dewatering of raw material	Tailings suspension sedimentation tank	**O, at the south-west façade ref. 4**	75	Akust. Cover or silencer **ΔLA = 20 dB** Reduce noise to ≤55 dB/1m.	**85 Forced ventilation for NIGHT**	**Walls+windows:** R´w ≥ 45 dB (windows ≤ 35% of wall area) **Ceiling (roof):** R´w ≥ 40 dB
		Tailings conveyor belt No. 4-6	I	70	-		
		Collecting belt conveyor of tailings	I	70	-		
		Centrifugal Sedimentation Slurry Pump	**O at the SW façade**	76	Akust. Cover or silencer **ΔLA = 15 dB**		

			artifier art.4		Reduce noise to ≤61 dB/1m.		**Skylights:** Rw ≥ 45 dB (centre hall strip, 4 m wide)
		Suspension centrifugal pump No. 1 and 2 (from sludge to settling tank)	I	82	2 in operation		
		Centrifugal pump water for callolis 1 and 2	I	76	-		
		Centrifugal pump water for kalolis Nos. 1-4	I	76	-		
		Submersible pump Nos. 1 and 2	I	76	-		
		Suspension centrifugal pump No. 1 and 2 (from sludge to settling tank)	I	76	-		
5	Leaching and iron removal	Stirred Leaching Reactor No. 1-7	I	82	-	**86 Forced ventilation for NIGHT**	**Walls+windows:** R´w ≥ 45 dB (windows ≤ 35% of the wall area) **Ceiling (roof):** R´w ≥ 40 dB **Roof skylights:** Rw ≥ 45 dB (strip in the middle of the hall, width 4 m)
		Stirred tank, compensation	I	82	-		
		Mixed iron removal reactor No. 1-6	I	82	-		
		Stirred reactor, transfer	I	82	-		
		Resuspension reactor	I	70	-		
		Centrifugal Pump of Leaching Reactors No. 1-5	I	83	-		
		Compensating hopper centrifugal pump Centrifugal pump of resuspension tray No. 1 and 2	I	76	-		
		Compensating hopper centrifugal pump Centrifugal pump of resuspension tray No. 1 and 2	I	76	-		
		Centrifugal pump transfer hopper No. 1 and 2	I	76	-		
		Anolyte Centrifugal Pump No. 1 - 3	I	76	-		
		Centrifugal filtrate pump No. 1-4	I	76	-		
		Sulphuric acid pump No. 1 and 2	I	76	-		
		Diaphragm pump of filter press No. 1-5	I	76	-		
		Diaphragm Cloth Cleaning Pump No. 1-6	I	76	-		
		Centrifugal filtrate pump No. 1-10	I	74	-		
		Iron removal filter press No. 1-9	I	70	-		
		Belt conveyor of filter presses No. 1-9	I	70	-		
		Collecting belt conveyor	I	80	-		
		Centrifugal pump transfer hopper No. 1 and 2	I	-	Quiet, liquid/liquid		
		Gantry Crane	I	81	Only occasional operation (maintenance only, i.e. use		

					once in a while for repairs of large parts)		
		Filter Cake Crusher	I	85	Slow-speed crusher		
		Centrifugal blower	I	110	Install in a separate room (Room Rw ≥ 40dB)		
		Screw feeder No, 1-3	I	70	-		
		Heat exchanger/condenser	I	-	Quiet, liquid/liquid		
		Centrifugal fan No. 1 and 2	I	88	Akust. Cover or silencer ΔLA = 5 dB Reduce noise to ≤83 dB/1m. There is no exhaust to the outside, it blows into another technological section.		
		Centrifugal fan + water scrubbing of gas from raw material leaching (B5-V1 exhaust)	**I/O**	83	Akust. Cover or silencer **ΔLA = 30 dB** Noise reduction to ≤53 dB/1m. .		
		Centrifugal fan + acid scrubbing of Fe/P removal gas (B5-V2 exhaust)	**O**	70	Akust. Cover or silencer **ΔLA = 15 dB** Noise reduction to ≤55 dB/1m**.**		
		Air temperature control system in halls 1-4	I	65	-		
		Heat exchanger/condenser	I	-	Quiet, liquid/liquid		
		Centrifugal fan	I	73	After damping (install a silencer on the exhalation)		
6	Preparation of solution for electrowinning	Stirred reactor for HM removal No. 1 and 2	I	70	-	**82 Forced ventilation for NIGHT**	**Walls+windows:** R´w ≥ 45 dB (windows ≤ 35% of the wall area)
		Stirred buffer tank for HM	I	70	-		
		Stirred reactor (for dosing activated carbon) No. 1 - 3	I	73	-		

							Ceiling (roof): R´w ≥ 40 dB **Roof skylights:** Rw ≥ 45 dB (strip in the middle of the hall, width 4 m)
		Stirred Buffer Tank for AC	I	73	-		
		Stirred reactor for preparation of BaS No. 1 and 2	I	71	-		
		Stirred BaS slurry reservoir	I	65	-		
		HM centrifugal slurry pump for filter presses No. 1-3.	I	76	-		
		HM centrifugal filtrate pump No. 1 and 2.	I	76	-		
		AC Filtrate Centrifugal Pump No. 1 & 2.	I	76	-		
		Centrifugal pump of AC suspension for filter presses No. 1-3.	I	76	-		
		Centrifugal pump cascade settling tank AC No. 1-6	**I/O**	76	Akust. Cover or silencer **∆LA = 20 dB** Noise reduction to ≤56 dB/1m .		
		Centrifugal Fresh Electrolyte Pump No. 1 & 2	I	76	-		
		Centrifugal pressurized water pump for filter presses No. 1 and 2	i	76	-		
		Centrifugal pump for washing cloths of filter presses No. 1 and 2	I	76	-		
		Submersible sump pump No. 1-3	I	76	The pump will be completely under liquid, operating 2		
		BaS Slurry Metering Pump No. 1-4	I	71	Small pump, operating 2		
		SDD metering pump No. 1 and 2 (small dosing pumps)	I	71	Small pump		
		Ammonium bisulfite dosing pump No. 1 and 2	I	66	Small pump		
		Belt conveyor of filter presses No. 1-6	I	70	-		
		Collecting belt conveyor No. 2	I	70	-		
		Filter press for HM filtration No. 1-3	I	70	-		

		Filter press for AC filtration No. 1-3	I	70	-		
		Final filter No. 1-6	I	70	-		
		Activated Carbon Weighing System No. 1 & 2	I	70	-		
		Weighing system for BaS No. 1 and 2	I	70	-		
		Filter cloth washer	I	70	-		
		Exhaust fans No. 1-4	**I/O**	64	Akust. Cover or silencer **∆LA = 15 dB** Reduce noise to ≤50 dB/1m.		
		Hose filter, BaS suspension preparation (Emission exhaust B6-V1)	**I/O**	77	Akust. Cover or silencer **∆LA = 20 dB** Reduce noise to ≤57 dB/1m.		
		Hose filter, precipitation of unwanted metals (Emission exhaust B6-V2)	**I/O**	77	Akust. Cover or silencer **∆LA = 20 dB** Reduce noise to ≤57 dB/1m.		
		Hose filter, sorption with activated carbon (Exhaust pipe B6-V3)	**I/O**	77	Akust. Cover or silencer **∆LA = 20 dB** Noise reduction to ≤57 dB/1m.		
		Hall air temperature control system	I	65	It doesn't have an outlet to the outside.		
7	Electrowinning	Electrolyzers No. 1, 2, 319, 320	I	70	-	**80 Forced ventilation for NIGHT**	**Walls+windows:** R´w ≥ 40 dB (windows ≤ 35% of the wall area) **Ceiling (roof):** R´w ≥ 40 dB **Roof skylights:** Rw ≥ 45 dB
		Centrifugal Analyte Pump No. 1 & 2	I	74	-		
		Ammonia water metering pump No. 1 and 2	I	66	-		
		Centrifugal washing water pump No. 1 and 2	I	76	-		
		Anolyte Circulation Centrifugal Pump No. 1-8	I	74	-		
		Exhausted centrifugal pump No. 1 and 2		76	-		

		Submersible pump No. 1-12		76	-		Rw ≥ 45 dB (strip in the middle of the hall – nave, width 4 m)
		Submersible sump pump No. 1 and 2		76	-		
		Electrode Handling System No. 1-4	I	81	-		
		Cathode 1 to 8 manganese metal peeling system	I	105	Cover Rw≥35 dB. Reduce noise to ≤80 dB/1m.		
		Anode Washing Unit and Stirred Reservoirs for Anode Sludge No 1-4	I	72	-		
		Frame cleaning unit for anodes No. 1 and 2	I	71	-		
		Filter press for anode slurries No. 1 and 2	I	70	-		
		Centrifugal exhaust fan No., 1-6	I	94	Akust. Cover or silencer **ΔLA = 20 dB** Reduce noise to ≤74 dB/1m. It does not have an outlet to the outside only to the washing tower		
		Gas scrubbing No. 1 and 2 (vents B7-V1 and B7-V2)	**O**	90	Akust. Cover or silencer **ΔLA = 30 dB** Reduce noise to ≤60 dB/1m.		
		Hose filter of cathode manganese recovery system, filters 1-8, air conditioning	**I/O**	75	Akust. Cover or shock absorber outwards **ΔLA = 15 dB** Reduce noise to ≤60 dB/1m.		
		Manganese Powder Packaging Hose Filter, Air Conditioning	**I/O**	75	Akust. Cover or shock absorber outwards **ΔLA = 15 dB** Reduce noise to ≤60 dB/1m.		
		Vibrating sieve No. 1 and 2	I	90	**Install Rotary Screen** Cover Rw≥30 dB. Reduce noise to ≤75 dB/1m.		
		EMM Belt Conveyors No. 1-8	I	70	-		
		Belt Scale No. 1-8	I	70	-		
		Dosing belt conveyor No. 1 and 2	I	70	-		
		Hose filter 1-8	I	75	Exhaust to the hall		

		Main rectifier No. 1-4	I	72	-		
		Auxiliary rectifier No. 1 and 2	I	72	-		
		Exhaust fan	**O**	68	Akust. Cover or shock absorber outwards **ΔLA = 15 dB** Reduce noise to ≤53 dB/1m.		
8	Mg removal	Crystallization reactor with stirrer No. 1-3.	I	72	-	**84 Forced ventilation for NIGHT**	**Walls+windows:** R´w ≥ 45 dB (windows ≤ 35% of the wall area) **Ceiling (roof):** R´w ≥ 40 dB **Roof skylights:** Rw ≥ 45 dB (strip in the middle of the hall, width 4 m)
		Dissolution reactor (crystals)	I	73	-		
		Mn precipitation reactor with stirrer No. 1-3	I	73	-		
		Stirred Precipitation Reactor Mg No. 1-4	I	73	-		
		Centrifugal pump – anolyte	I	76	-		
		Centrifugal Feed Pump Centrifuges Solution After Centrifugation No. 1 & 2	I	76	-		
		Centrifugal pump of crystal dissolution solution No. 1 and 2	I	76	-		
		Centrifugal pump of solution after filtration of Mn precipitated slurry No. 1 and 2	**O**	76	Akust. Cover or silencer **ΔLA = 15 dB** Reduce noise to ≤61 dB/1m.		
		Centrifugal pump of solution after filtration Mg (to MVR) No. 1 and 2	**O**	76	Akust. Cover or silencer **ΔLA = 15 dB** Reduce noise to ≤61 dB/1m.		
		Centrifugal pump of solution after filtration Mg (until ammonia recovery) No. 1 and 2	**O**	76	Akust. Cover or silencer **ΔLA = 15 dB** Reduce noise to ≤61 dB/1m.		
		Centrifugal pump for scrubbing filter presses No. 1 and 2	I	76	-		
		Centrifugal washing water pump for filter presses No. 1 and 2	I	76	-		
		Submersible sump pump No. 1 and 2		76	-		
		Ammonium Sulfate Suspension Feed Pump	I	78	-		
		Centrifugal pump Mn precipitation suspension	I	74	-		
		Feed pump Mn slurry No. 1 and 2	I	74	-		
		Centrifugal pump for filter press, Mg slurry No. 1 and 2	I	76	-		

		Centrifuge	I	100	Akust. Cover or silencer **ΔLA = 15 dB** Reduce noise to ≤85 dB/1m.		
		Filter press for precipitated suspension Mn No. 1 and 2	I	70	-		
		Filter press for precipitated suspension Mg No. 1 and 2	I	70	-		
		Conveyor belt	I	70	-		
		Centrifugal condensate pump	I	76	-		
		Circulating pump	I	86	-		
		Mother liquor pump	I	76	-		
		Centrifugal Crystal Suspension Pump	I	76	-		
		Compressor	I	110	Akust. Cover or silencer **ΔLA = 30 dB** Reduce noise to ≤80 dB/1m.		
		Stirred Reactor Suspension	I	71	-		
		Centrifuge	I	100	Cover R´w≥20 dB. Reduce noise to ≤83 dB/1m.		
		Crystallizer	I	80	-		
		Blower No. 1-3	I	101	Cell R´w≥30 dB. Reduce noise to ≤80 dB/1m. in operation 2		
		Centrifugal fan No. 1 and 2	**I/O**	82	Akust. Outward-facing cover or shock absorber **ΔLA = 30 dB** Reduce noise to ≤52 dB/1m.		
		Hall air temperature control system	I	65	It does not have an exhaust pipe.		
		Centrifugal condensate pump No. 1 and 2	I	73	-		
		Exhaust B8-V1, acid scrubbing, Mg and Mn precipitation	**O**	80	Akust. Cover or silencer **ΔLA = 30 dB** Reduce noise to ≤50 dB/1m.		

		Centrifugal fan air conditioning No. 1-14	I	73	After damping (install a silencer on the exhalation)		
9	Leach Residue dewatering	Stirred Flush Tank of Filter Cake	I	70	-	**81 Forced ventilation for NIGHT**	**Walls+windows:** R´w ≥ 45 dB (windows ≤ 35% of the wall area) **Ceiling (roof):** R´w ≥ 40 dB **Roof skylights:** Rw ≥ 45 dB (strip in the middle of the hall – nave, width 4 m)
		Centrifugal pump of cake washing filter press No. 1-4	I	81	-		
		Centrifugal filtrate pump No. 1 and 2	I	76	-		
		Centrifugal slurry pump No. 1-6	I	76	-		
		Centrifugal pump washing cloths No. 1 and 2	I	76	-		
		Filter press No. 1-9	I	70	-		
		Submersible sump pump No. 1 and 2	I	76	-		
10	Ammonia recovery**, mixed ventilation**	Exhaust fan – air conditioning No. 1-4	**I/O**	82	Akust. Cover or shock absorber facing outwards **∆LA = 30 dB** Reduce noise to ≤52 dB/1m.	**80 Forced ventilation for NIGHT**	Exterior cladding, including windows – $R_{w} \geq$ 32 dB
		Ammonia Recovery System	I	82	Akust. Cover or silencer **∆LA = 5 dB** Reduce noise to ≤77 dB/1m.		
		Acid scrubbing system (B10-V1 exhaust)	**O**	76	Akust. Cover or silencer **∆LA = 20 dB** Reduce noise to ≤56 dB/1m.		
		Feed axial fan	I	80	Akust. Cover or silencer **∆LA = 5 dB** Reduce noise to ≤75 dB/1m.		
11	Sulphuric acid storage tanks (outdoor) **without ventilation - outdoor**	Exhaust fan – air conditioning No. 1-4	**O**	74	Akust. Cover or silencer **∆LA = 20 dB** Reduce noise to ≤54 dB/1m.	-	There are no requirements for construction.
		Ammonia Recovery System	**O**	76	Akust. Cover or silencer **∆LA = 20 dB** Reduce noise to ≤56 dB/1m.		
		Acid scrubbing system (B10-V1 exhaust)	**O**	76	Akust. Cover or silencer **∆LA = 20 dB**		

					Reduce noise to ≤56 dB/1m.		
		Feed axial fan	**O**	76	Akust. Cover or silencer **ΔLA = 20 dB** Reduce noise to ≤56 dB/1m.		
12	Lime oxide silos **without ventilation - outdoors**	Blower (roots system) No. 1-8	**O**	**102**	Akust. Cover or silencer **ΔLA = 30 dB** Reduce noise to ≤72 dB/1m. A maximum of 4 blowers in operation at a time. **DAY ONLY**	-	There are no requirements for construction.
		Lime quenching system	**O**	76	Akust. Cover or silencer **ΔLA = 20 dB** Reduce noise to ≤56 dB/1m.		
		Centrifugal milk lime pump No. 1 & 2	**O**	76	Akust. Cover or silencer **ΔLA = 20 dB** Reduce noise to ≤56 dB/1m.		
13	Hydrogen Recovery Unit	Scrubbing	I	80	-	**83 Forced ventilation for NIGHT**	**Walls+windows:** R´w ≥ 45 dB (windows ≤ 35% of the wall area) **Ceiling (roof):** R´w ≥ 40 dB
		Washed hydrogen compressor No. 1 and 2	I	85	Akust. Cover or silencer **ΔLA = 15 dB** Reduce noise to ≤70 dB/1m.		
		Steam boiler (ZP/hydrogen) No. 1-3Boiler, **inside**	I	75	-		
		Feed Water Treatment Plant	I	60	-		
		Centrifugal feed water pump No.1-6-	I	76	-		
		Blower No. 1-3	I	100	Akust. Cover or silencer **ΔLA = 25 dB** Reduce noise to ≤75 dB/1m.		
		Exhaust Gas Fan No. 1-3	**O**	71	Akust. Cover or shock absorber facing outwards **ΔLA = 15 dB** Reduce noise to ≤56 dB/1m.		

		Emission exhaust B13-V1-3 (steam production, hydrogen/ZP fuel), exhaust is a chimney	**O**	60	-		
		Emergency burner (flare) Exhaust pipe B13-V4 (emergency)	O	110 (emergency)	Crash only		
14	Technical and administrative building **, natural ventilation, except for fans in the sanitary facilities**	Ceiling fan – air conditioning No. 1-16	I/O	45	-	-	Full outdoor shell $R_{w} \geq 45$. Windows – R w ≥ 32 dB - common workplaces, R w ≥ 36 dB - laboratories.
		ATEX side exhaust fan no. 1 and 2	I/O	45	-		
		Side fan – air conditioning system No. 1-12	I/O	55	-		
		Laboratory extractor/fume hood No. 1 and 2 Exhaust pipe B14-V1 (sample preparation for analysis) Exhaust pipe B14-V2 (analytical laboratory)	I/O	67	Akust. Cover or shock absorber facing outwards **ΔLA = 15 dB** Reduce noise to ≤52 dB/1m.		
15	Manganese metal dissolution	EMM Dispensing System No. 1-6	I	40	-	**85 Forced ventilation for NIGHT**	**Walls+windows:** R´w ≥ 45 dB (windows ≤ 35% of the wall area) **Ceiling (roof):** R´w ≥ 40 dB
		Stirred Dissolution Reactor No. 1-12	I	82	Akust. Cover or silencer **ΔLA = 15 dB** Reduce noise to ≤67 dB/1m.		
		Centrifugal Dissolution Reactor Circulation Pump No. 1-24	I	76	-		
		Stirred Reactor Neutralization No. 1-2	I	70	-		
		Centrifugal Circulation Pump of Neutralization Reactor No.1-4	I	76	-		
		Mixed raw solution reservoir	I	70	-		
		Centrifugal solution pump for filter presses No. 1 and 2	I	76	-		
		Filter press No. 1 and 2	I	70	-		
		Centrifugal filtrate feed pump No. 1 and 2	I	76	-		
		H2SO4 submersible sump pump No. 1 and 2	I	76	Emergency		
		Sulphuric acid dosing pump No. 1 and 2	I	73	-		
		Mn dust belt weighers No. 1 and 2	I	70	-		
		ATEX exhaust centrifugal fan for dissolution reactors No. 1 to 24,	**I/O**	73	Akust. cover or silencer in case of outdoor placement **ΔLA = 20 dB** Reduce noise to ≤53 dB/1m.		
		Centrifugal exhaust fan (emergency), ATEX.	**I/O**	89	Akust. Cover or silencer		

					ΔLA = 15 dB Reduce noise to ≤74 dB/1m. Only in the event of a crash.		
		Compact hose filter with integrated fan for belt scales	**I/O**	82	Akust. Cover or shock absorber facing outwards **ΔLA = 30 dB** Reduce noise to ≤52 dB/1m. Inward **ΔLA = 5 dB** Reduce noise to ≤77 dB/1m.		
		Hose filter, demister, neutralization of free acid with powdered manganese (Exhaust B15-V1)	**I/O**	70	Akust. Cover or shock absorber facing outwards **ΔLA = 15 dB** Reduce noise to ≤55 dB/1m.		
		Manganese powder dosing hose filter (Emission pipe B15-V2)	**I/O**	70	Akust. Cover or shock absorber facing outwards **ΔLA = 15 dB** Reduce noise to ≤55 dB/1m.		
		Hall air temperature control system	I	76	It does not have an exhaust pipe.		
16	Purification of manganese sulfate solution	Centrifugal pump of filter press for Zn removal No. 1 and 2	I	76	-	**83 Forced ventilation for NIGHT**	**Walls+windows:** R´w ≥ 45 dB (windows ≤ 35% of the wall area) **Ceiling (roof):** R´w ≥ 40 dB
		Zn filter press removal No. 1 and 2	I	70	-		
		Stirred reactor to remove Zn No. 1 and 2	I	72	-		
		Stirred reactor to remove Fe No. 1 and 2	I	72	-		
		Fe removal filter press centrifugal pump, first stage No. 1 and 2	I	76	-		
		Fe filter press removal No. 1 and 2	I	70	-		
		Fe Filtrate Centrifugal Pump No. 1 & 2	I	76	-		
		Fe removal filter press centrifugal pump, second stage No. 1 and 2	I	76	-		
		Centrifugal pump of purified solution No. 1 2	I	76	-		

		Stirred reactor for scrubbing of Zn residues No. 1 and 2	I	71	-		
		Centrifugal pump of Zn residues No. 1 and 2	I	76	-		
		Stirred reactor of Fe residue scrubbing stage, first stage No. 1 and 2	I	71	-		
		Fe Removal Suspension Centrifugal Pump No. 1 & 2	I	76	-		
		Dispersion reservoir of residues No. 1 and 2	I	71	-		
		Dispersed Residue Centrifugal Pump, No. 1 & 2	I	76	-		
		Stirred reactor of Fe residue scrubbing stage, second stage No. 1 and 2	I	78	-		
		Fe Removal Suspension Centrifugal Pump No. 1 & 2	I	76	-		
		Filter press of residues	I	70	-		
		Centrifugal pump for washing residues No. 1 and 2	I	71	-		
		Stirred Tank BaS Suspension	I	62	-		
		BaS metering pump	I	62	-		
		H2O2 Stirred Reservoir	I	65	-		
		H2O2 metering pump No. 1 and 2	I	62	-		
		Submersible sump pump No. 1-3	I	76	-		
		High-pressure pump for residue scrubbing in filter presses No. 1 and 2	I	76	-		
		Exhaust fan, air conditioning	**I/O**	73	Akust. Cover or shock absorber facing outwards **ΔLA = 15 dB** Reduce noise to ≤58 dB/1m.		
		Exhaust fan, ATEX, air conditioning no. 1 and 2	I/O	73 (emergency)	Emergency		
		Stirred Zn removal tray, demister (B16-V1 exhaust)	**I/O**	70	Akust. Cover or shock absorber facing outwards **ΔLA = 15 dB** Reduce noise to ≤55 dB/1m.		
		Fixing hopper after Zn removal (Emission exhaust B16-V2)	**I/O**	50	Just breathing tray, no stirrer or fan		

		Hall air temperature control system	I	73	It does not have an exhaust pipe.		
		Exhaust Fan No. 1-8	**I/O**	73	Akust. Cover or shock absorber facing outwards **ΔLA = 15 dB** Reduce noise to ≤58 dB/1m.		
17	HPMSM Evaporation/Crystallization/Drying/Packaging	Pressure centrifugal fan of dryer No. 1 and 2	I	98	Akust. Cover or silencer **ΔLA = 30 dB** Reduce noise to ≤75 dB/1m.	**Vyšší hala 83 Forced ventilation for NIGHT**	
		Steam liquid separator	I	60	-		
		Centrifugal condensate pump No. 1 and 3	I	76	-		
		Buffer condensate tank with pump	I	76	-		
		Steam recompression equipment from evaporators No. 1 and 2	I	98	Akust. Cover or silencer **ΔLA = 30 dB** Reduce noise to ≤75 dB/1m.	**Nižší hala 77 Forced ventilation for NIGHT**	**Upper hall Walls+windows:** R´w ≥ 45 dB (windows ≤ 35% of the wall area) **Ceiling (roof):** R´w ≥ 40 dB
		Crystallizer No. 1# and 2#	I	-	-		
		Crystal Suspension Centrifuge No. 1-6	I	100	Akust. Cover or silencer **ΔLA = 30 dB** Reduce noise to ≤75 dB/1m.		
		Mother Solution Centrifugal Pump No. 1 & 2	I	76	-		**Lower hall Walls+windows:** R´w ≥ 40 dB (windows ≤ 35% of the wall area) **Ceiling (roof):** R´w ≥ 40 dB
		Stirred Crystal Suspension Reactor No. 1 and 2	I	72	-		
		Feeder, **indoors**	I	70	-		
		Hose filter	**I/O**	75	Akust. Cover or silencer **ΔLA = 20 dB** Reduce noise to ≤55 dB/1m.		
		Disc dryer	I	80	-		
		Dryer Exhaust Fan	I	71	The exhaust does not go out, but into the filter		
		B17-V1 exhaust pipe, hose filter, dryer and packaging	**O**	70	Akust. Cover or silencer **ΔLA = 15 dB** Reduce noise to ≤55 dB/1m.		
		Product Belt Conveyor No. 1-6	I	70	-		

		Big-bag filling unit	I	80	Akust. Cover or silencer **ΔLA = 5 dB** Reduce noise to ≤75 dB/1m.		
		Filling line for 25 kg bags No. 1 and 2	I	75	-		
		Hopper aeration system	I	78	-		
		Palletizing Unit No. 1 & 2	I	75	-		
18	Administrative building **natural ventilation**	Air Duct Exhaust Fan No. 1-4	**I/O**	45	-	-	Full outdoor shell $R_{w} \geq 45$. Windows – $R_{w} \geq 36$ dB – offices.
		Fire Fan – Smoke Extraction	I/O	84	Emergency ventilation.		
19	Changing room and dining room **natural ventilationexcept for fans in the bathrooms**	Ceiling Exhaust Fan No. 1-7	**I/O**	45	-	-	Full Outdoor Shell Rw ≥ 45 dB. Windows – $R_{w\,w} \geq 32$ dB.
		Side exhaust fan No. 1-7	**I/O**	55	Akust. Cover or shock absorber facing outwards **ΔLA = 15 dB** Reduce noise to ≤45 dB/1m.		
		ATEX side exhaust fan no. 1 and 2	**I/O**	57	Akust. Cover or shock absorber facing outwards **ΔLA = 15 dB** Reduce noise to ≤45 dB/1m.		
		Axial fan – duct	**I/O**	67	Akust. Cover or shock absorber facing outwards **ΔLA = 20 dB** Reduce noise to ≤47 dB/1m.		
		Centrifugal condensate pump from the ventilation system	**I/O**	66	Akust. Cover or shock absorber facing outwards **ΔLA = 15 dB** Reduce noise to ≤51 dB/1m.		
20	Product Warehouse **Natural Ventilation**	Air Duct Exhaust Fan No. 1-5	I/O	55	Akust. Cover or shock absorber facing outwards **ΔLA = 15 dB** Reduce noise to ≤45 dB/1m.	-	Exterior cladding, including windows – $R_{w} \geq$ 32 dB
21	Maintenance workshop and spare	Gantry Crane	I	80	Maintenance building – only occasional operation	-	
		Lathe No. 1 & 2	I	80			

	parts warehouse **, natural ventilation**	Grinding machine	I	80			Exterior cladding, including windows – $R_{w} \geq$ 32 dB
		Cutter	I	80			
		Drill No. 1-3	I	90			
		Assembly press	I	80			
		Cutter No. 1-3	I	80 - 100			
		Machine saw No. 1 and 2	I	80			
		Mobile compressor	I	95			
		Pneumatic and electric tools	I	80			
22	Compressor station	Screw compressor No. 1-4	I	110	Cell R´w≥40 dB*. Reduce noise to ≤80 dB/1m.	**86 Forced ventilation**	**Walls+windows:** R´w ≥ 40 dB (windows ≤ 35% of the wall area) **Ceiling (roof):** R´w ≥ 40 dB
		Axial fan ventilation system No. 1-4	**I/O**	55	Akust. Cover or shock absorber facing outwards **ΔLA = 15 dB** Reduce noise to ≤45 dB/1m.		
23	Pumping stations for service and fire water	Side fan air conditioning no. 1 and 2	**I/O**	55	Akust. Cover or shock absorber facing outwards **ΔLA = 15 dB** Reduce noise to ≤45 dB/1m.	**84 Forced ventilation**	**Walls+windows:** R´w ≥ 45 dB (windows ≤ 35% of the wall area) **Ceiling (roof):** R´w ≥ 40 dB
		Centrifugal fresh water pump No. 1 and 2	I	76	-		
		Fire Hydrant Centrifugal Pump	I	76	Emergency		
		Diesel fire generator set, hydrant network (in the shelter)	I	81	Emergency		
		Centrifugal pressure maintenance pumps in hydrant network No. 1 and 2	I	76	-		
24	Industrial Water Treatment Plant and Pumping Station	Air Duct Exhaust Fan No. 1-2	**I/O**	55	Akust. Cover or shock absorber facing outwards **ΔLA = 15 dB** Reduce noise to ≤45 dB/1m.	**84 Forced ventilation**	**Walls+windows:** R´w ≥ 45 dB (windows ≤ 35% of the wall area) **Ceiling (roof):** R´w ≥ 40 dB
		Centrifugal pump No. 1-3	I	52	-		
		Centrifugal pump for glands No. 1-2	I	76	-		
		Centrifugal backwash pump	I	76	-		

		Gantry Crane	I	75	Only occasional operation (maintenance only)		
		Submersible Dirty Water Pump No. 1 & 2	I	76	-		
		Filter press and its pump (sludge from water treatment) No. 1 and 2	I	76	-		
25	Process Water Treatment Plant	Side fan, air handling No. 1 and 2	**I/O**	70	Akust. Cover or shock absorber facing outwards **ΔLA = 20 dB** Reduce noise to ≤50 dB/1m.	**84 Forced ventilation**	**Walls+windows:** R´w ≥ 45 dB (windows ≤ 35% of the wall area) **Ceiling (roof):** R´w ≥ 40 dB
		Centrifugal return water pump	I	73	-		
		Centrifugal raw water pump, first stage of purification No. 1 and 2	I	71	-		
		First stage high-pressure pump	I	76	-		
		Centrifugal raw water pump, second stage of purification No. 1 and 2	I	71	-		
		First stage high-pressure pump	I	76	-		
		Dosing pumps for cleaning chemicals, 6pcs	I	60	Small pump		
		Clot Slurry Pump No. 1 & 2	I	71	-		
		Filter unit with pumps No. 1 and 2		71	-		
		Pure water centrifugal pump No. 1 and 2	I	76	-		
26	Cooling circuit of the production process	Cooling Tower No. 1 & 2 Centrifugal Circulation Pump	I	85	Installed in the technical hall	**90 Forced ventilation**	**Walls+windows:** R´w ≥ 40 dB (windows ≤ 35% of the wall area) **Ceiling (roof):** R´w ≥ 40 dB
		Counterflow Cooling Tower	**O**	85 (L_{WA} = 112 dB)	Akust. Cover or silencer **ΔLA = 25 dB** Reduce noise to ≤60 dB/1m. LWA ≤ 87 dB	**-**	-
27	Electrowinnig of-gas purification system	Centrifugal fan No. 1 and 2	**O**	94	Akust. Cover or shock absorber facing outwards **ΔLA = 30 dB**	**-**	-

	without ventilation - outdoors				Reduce noise to ≤64 dB/1m.		
		Centrifugal scrubbing pump No. 1 and 2	**O**	74	Akust. Cover or silencer **ΔLA = 20 dB** Reduce noise to ≤54 dB/1m.		
		Exhaust pipe B27-V1, acid scrubbing, electrochem. Mn reduction	**O**	70	Akust. Cover or silencer **ΔLA = 15 dB** Reduce noise to ≤55 dB/1m.		
		Exhaust pipe B27-V2, acid scrubbing, electrochem. Mn reduction	**O**	70	Akust. Cover or silencer **ΔLA = 15 dB** Reduce noise to ≤55 dB/1m.		
		Gas scrubbing (it includes a counter-current cooling tower – the pool is covered around the perimeter of the tower structure – it is not open, there is a fan outlet from above)	**O**	75 (L_{WA} = 108 dB)	Akust. Cover or silencer **ΔLA = 20 dB** Reduce noise to ≤55 dB/1m. LWA ≤ 88 dB		
28	Electrowinnig cooling circuit	Cooling Tower Centrifugal Pump No. 1 & 2	I	85	Installed in the technical hall	**90 Forced ventilation**	**Walls+windows:** R´w ≥ 40 dB (windows ≤ 35% of the wall area) **Ceiling (roof):** R´w ≥ 40 dB
		Counterflow cooling tower No. 1 and 2	**O**	85 (L_{WA} = 111 dB)	Akust. Cover or silencer **ΔLA = 25 dB** Reduce noise to ≤60 dB/1m. LWA ≤ 86 dB	**-**	-
29	Industrial Wastewater Treatment Plant	Centrifugal circulating pump No. 1 and 2	I	73	-	**86 Forced ventilation**	**Walls+windows:** R´w ≥ 40 dB (windows ≤ 35% of the wall area) **Ceiling (roof):** R´w ≥ 40 dB
		Centrifugal pump of filter presses No. 1 and 2	I	76	-		
		Centrifugal pump of filter press scrubbing	I	76	-		
		Filter press 1 and 2	I	-	Quiet, sand filter		
		Centrifugal feed pump No. + and 2	I	76	-		
		Submersible sump pump No. 1-2	I	76	-		

30	Rainwater Treatment Plant	Submersible suction pump No. 1 and 2	**O**	60	-	**81 Forced ventilation**	**Walls+windows:** R´w ≥ 40 dB (windows ≤ 35% of the wall area) **Ceiling (roof):** R´w ≥ 40 dB
		Centrifugal pump of filter presses No. 1 and 2	I	76	-		
		Centrifugal pump of filter press scrubbing	I	76	-		
		Submersible pump 1 and 2	**O**	76	Akust. Cover or silencer **ΔLA = 15 dB** Reduce noise to ≤61 dB/1m.		
		Filter press	I	70	-		
31	Heat exchanger station	Hot water exchanger No. 1-3	I	65		**85 Forced ventilation**	**Walls+windows:** R´w ≥ 40 dB (windows ≤ 35% of the wall area) **Ceiling (roof):** R´w ≥ 40 dB
		Centrifugal pump No. 1 and 2	I	76			
		Water softening unit	I	60			
		Side fan, air conditioning No. 1-3	**I/O**	65	Akust. Cover or silencer **ΔLA = 15 dB** Reduce noise to ≤50 dB/1m.		
32	Ammonium sulfite reservoir **natural ventilation**	Ammonium Sulfite Metering Pump No. 1-4	**I/O**	73	Akust. Cover or silencer **ΔLA = 20 dB** Reduce noise to ≤53 dB/1m.	**-**	-
33	Spare parts warehouse**, natural ventilation**	Ceiling fan, air conditioning	**I/O**	45	After damping (install a silencer on the exhalation)	**≤70**	-
		Side fan, air conditioning No. 1-3	**I/O**	60	Akust. Cover or silencer **ΔLA = 15 dB** Reduce noise to ≤45 dB/1m.		
34	Taillings thickener **without ventilation**	Sedimentation Tank	**O**	70	Akust. Cover or silencer **ΔLA = 20 dB** Reduce noise to ≤50 dB/1m.	-	-
35	Concentrate thickener **without ventilation**	Sedimentation Tank	**O**	70	Akust. Cover or silencer **ΔLA = 20 dB** Reduce noise to ≤50 dB/1m.	-	-
36	Tank for potentially contaminated water **without ventilation**	-	**O**	76	Akust. Cover or silencer **ΔLA = 20 dB**	-	-

					Reduce noise to ≤56 dB/1m.		
37	Rainwater tank **without ventilation**	-	**O**	76	Akust. Cover or silencer **ΔLA = 20 dB** Reduce noise to ≤56 dB/1m.	-	-
38	Main Substation **Mixed Ventilation**	2x cell 9x8x8 m, inside is a transformer	**I/O**	L_{WA} = 70 dB	On the HVAC diffuser facing outwards, install a silencer with a mean attenuation value of dSlStr ≥ 25 dB (63 – 2000 Hz)	**82 Forced ventilation**	**Walls+windows:** R´w ≥ 40 dB (windows ≤ 35% of the wall area) **Ceiling (roof):** R´w ≥ 40 dB
39	Substation Mixed Ventilation	Transformer and ventilation, replaced by a 10x point source SW from the main substation.	**I/O**	L_{WA} = 66 dB	On any HVAC diffuser facing outwards, install a silencer with a mean attenuation value of dLstř ≥ 25 dB (63 – 2000 Hz)	**-**	-
40	Back-up power source Without ventilation	DA Sets (B40-V1 exhaust pipe, engine exhaust)	**O**, container	100 (Emergency, tests 30 min)	Cell R´w≥40 dB*. Reduce noise to L Aeq,T ≤80dB/1m from exhaust and LAeq,T ≤ 72dB/1m from contour.	**-**	-
41	Nitrogen Making Device	Air compressor	I	70	After the compressor is covered, the noise $L_{Aeq,T\ must\ be}$ ≤ 70dB/1m from the contour of the cover in the free field. The compressor is also in the building with R'w parameters ≥ 45 dB	**75**	**Walls+windows:** R´w ≥ 45 dB (windows ≤ 35% of the wall area) **Ceiling (roof):** R´w ≥ 45 dB
42	Technological bridge**, natural ventilation**	Bridge technology	O	65 dB v 1 m.	Akust. Cover or silencer **ΔLA = 10 dB** Reduce noise to ≤55 dB/1m.	-	-
43	Workshop and administrative facilities of siding**, natural ventilation**	Repair equipment		80	Just maintenance, occasional operation		Full Outdoor Shell R'w ≥ 40. Windows – R w ≥ 32 dB - normal workplaces, R w ≥ 36 dB - offices.

Sources of traffic noise

The analysis of the traffic situation on the monitored roads is dealt with in detail in Chapter B.II.6, the issue of load on transport networks and related noise emissions is described in an acoustic study. Traffic noise caused by the project can be evaluated on the basis of a prepared study of the road connection and its update. The assessment is based on traffic intensities on individual road sections in individual calculation years in the state with and without intent.(Králíček, 2023)(Vachtl, 2019)(Melzer, a další, 2022)

- **Automobile transport**

The operation of car traffic on public roads in the vicinity of the tailings is essential for the existing noise burden in the assessed area. In order to be able to objectively evaluate traffic noise, a calculation was made taking into account all traffic intensity, and in addition to data on traffic intensity from the Road and Motorway Directorate, the results of the traffic census in noise measurements and data from the operators of the surrounding industrial sites were also used.

The dominant sources of noise are class II roads No. 322 and class I roads No. 2.

Road No. 322 (Chvaletice – Řečany nad Labem) is the main access road for the project itself, the Chvaletice Power Plant and other industrial areas in the vicinity. The road in the part of Chvaletice and the power plant does not lead directly through the village. It runs further away from the residential area. In the part of Chvaletice, it is separated by a noise barrier 3 m high. Transport here consists of all types of cars, from passenger cars to buses, to heavy and light trucks. The speed of cars is reduced to a level of up to 70 km/h in the part of the passage around the village of Chvaletice, otherwise the normal limit is 90 km/h. The surface of the road is ordinary asphalt, relatively flat without holes and cracks. Traffic is smooth on the road in the monitored section Chvaletice – Trnávka.

Road No. 2 (from road No. 322 – Bernardov, through Zdechovice) is heavily burdened with traffic, especially heavy trucks TIR and NA with trailers. A significant share of heavy freight transport consists of the transport of material from the quarry (the operator is GRANITA s.r.o.). The quarry is situated southeast of the Hornická čtvrť, in the village of Chvaletice. Road No. 2 runs through the villages of Zdechovice, Spytovice and Bernardov, near residential buildings. In municipalities, the speed of cars is officially 40 to 50 km/h, outside municipalities the speed is 90 to 100 km/h. The surface of the road in some municipalities is a high-quality asphalt cover without holes and cracks. Outside the villages, the surface (especially in the part of the connection to the traffic from the quarry) is coarser, the asphalt is cracked in places but mostly repaired.

- **Train transport**

There are two basic subcategories of this type of noise source in the area, namely the railway line No. 010 and the railway siding in the area of the project.

Railway line No. 010 (connection Kolín – Přelouč) is a heavily loaded railway line serving both passenger and freight transport, which is manifested especially at night. The maximum line speed in this section is 160 km/h. A speed of 160 km/h is considered for the Pendolino, regular fast trains from 130 to 150 km/h, freight trains up to 90 km/h. Along the track, in certain places in the direction of the protected built-up area, there are noise barriers with a height of 3.5 m. There are noise barriers in the direction of the village of Trnávka, through which the line runs along its southern edge, and there are also screens in the direction of the village of Chvaletice, around which the line runs on its northern edge. There are also screens at the village of Řečany nad Labem. The line is fully electrified, the rail laying is flexible without a base on concrete sleepers. No damping elements are present. In terms of noise, this type of noise source is most pronounced in the area, especially at night when freight traffic is carried on the line.

The railway siding runs from the railway station Řečany nad Labem to the industrial zone at the site of the project. At present, the siding is mainly used to supply the Chvaletice Power Plant. According to SŽDC´s announcement, the line is loaded with a total of 5 freight trains for the day and 3 for the night to the Chvaletice Power Plant (number of wagons of each train 15, length 390 m, these are double bogies), these sets passed through the area even during the noise measurement. The siding is not electrified. The rails are mounted on rigid baseboards on wooden sleepers. The speed of trains is 20 to 40 km/h.

Traffic loads are given for the following variants, or states of the territory, for the calculation of noise. A definition of the individual variants of noise calculation is given in Chapter 6.6.2. Acoustic studies.

Variants of noise calculation:

- *Year 2000* = for old noise pollution
- *Year 2022* = current situation
- *Year 2025 BEZ* = Prospective state without project
- *Year 2028 WITHOUT* = Prospective status without project
- *Year 2028 WITH THE PROJECT YEAR 1* = Prospective state with the project in the 1st year of mining – terrain modification
- *Year 2028 WITH THE PROJECT YEAR 3* = Prospective state with the project in the 3rd year of mining – terrain modification. This is a hypothetical option
- *Year 2043 BEZ* = Prospective state without project
- *Year 2043 WITH THE PROJECT YEAR 18* = Prospective state with the project in the 18th year of mining – terrain modification
- *CONSTRUCTION SITE TRANSPORT (maximum option)* – traffic load only from construction activities within the implementation of the project. A total of 80 TN (i.e. 160 journeys at the entrance to the construction site) is considered as the maximum stock, and the calculation also includes an estimate of passenger transport in the number of 100 PV and 40 LN as material imports, i.e. 200 trips of PV and 80 trips of LN. This is the maximum state that is considered for all construction phases according to Chapter 7 of the AS. The unraveling of TN heavy trucks is considered to the greatest extent to the east by road No. 322 (estimated 95% TN), then about 50% by TN road No. 2 and 45% by TN further east, the remaining 5% is considered to be in the direction of Chvaletice by road No. 322 to the west.

These variants of the calculation represent different situations of the position of noise sources in relation to the surrounding municipalities.

The results of the acoustic calculations are given in Chapter D.I.3, as well as the impact assessment.

Vibration

Vibrations from quarry operation

The operation of the quarry will not generate any vibrations that would spread to the surroundings. Blasting work will not be used.

The vibrations will act only on the operator of working machines, but it is expected to use modern mechanization with high comfort and low negative effects on the operator.

Vibration from the processing plant

There will be no significant sources of vibration in the processing plant.

Vibration from traffic

The heavy trucks that will operate the project can theoretically be a source of vibration that spreads from the road to the surroundings and can also be reflected in structures adjacent to roads.

Vibrations can only be detected at the point of action by measurement. Prediction by calculation is practically impossible. Traffic vibrations depend to a large extent on the quality of the road surface, the speed of vehicles and the distance of objects from the road. From this point of view, road II/322 can be characterized as an insignificant source of vibrations.

Details on the effect of vibration from traffic are given in Chapter D.I.3.

Radioactive, electromagnetic radiation

Within the whole project, neither artificial sources of radioactive radiation nor significant sources of electromagnetic radiation that would affect the surroundings will be operated.

Electromagnetic separation is a common process for the treatment and refinement of minerals. It is used, for example, in the removal of undesirable impurities in the treatment of glass sands or kaolin. The effects of the magnetic field used in electromagnetic separation are concentrated only on the immediate surroundings of the device itself, not outside buildings.

Light pollution

The project will be adequately illuminated during the operation period so that all processes operating in reduced visibility can be operated safely and reliably. Extraction of the raw material and reclamation work will take place from 6 a.m. to 10 p.m., i.e. even in low visibility. The operation of the plant (including the leaching station in DP) will be three-shift, i.e. also at night. At night, however, the processing processes will take place almost exclusively indoors.

Mining (as well as remediation and reclamation work) will not take place at night. Lighting of mining sites will therefore be only during the daytime (6:00 - 22:00) and only in reduced visibility. In reality, the time interval will be even shorter, because employees come to work at 6 a.m. and leave the campus at 10 p.m. Mining and transport equipment is equipped with its own headlights for work in the dark or in low visibility. This lighting is sufficient for the work, so no external lighting (on poles, etc.) will be built. Mechanization illuminates the space at its own workplace and the internal road. The aim of this lighting is to ensure efficient and safe performance of one's own work activities. High beams will not be used on trucks. In addition, the main quarry road runs on a lowered terrain between tailings (existing and newly built), so the light from trucks to it will not spread outside the mining area. During the entire course of mining, there will always be only 2 workplaces in the area (one excavator on each and trucks gradually arriving to it).

The entire area of the processing plant will be illuminated by outdoor lighting of the internal roads and handling areas. Modern outdoor lighting will be used respecting the requirements of the new standard ČSN 36 0459 – Reduction of undesirable effects of outdoor lighting (effective March 2023). The requirements of this standard will be taken into account and will be specified in further design work for the follow-up procedure.

The effects associated with light pollution are evaluated in Chapter D.3. Measures to minimise impacts are listed in Chapter D.IV.

Odour

The issue of possible odours is taken into account in the dispersion study, which is Annex No. 2, where possible immission contributions to ammonia and hydrogen sulfide concentrations were evaluated in terms of odour effects of these pollutants.(Zambojová, 2022)

The olfactory thresholds for ammonia are set in the range of 30 to 72 000 μg/m3. Immission contributions to the maximum hourly ammonia concentrations range from 0.2 to 1.0 μg/m3 in the locality of interest, and from 0.4 to 0.6 μg/m3 in the nearest residential area. The graphical appendices of the dispersion study also show that the values of immission contributions to hourly ammonia maxima are below 0.8 μg/m3. These values are therefore significantly lower than the lowest reported value of the olfactory threshold of ammonia (i.e. 30 μg/m3).

The olfactory threshold of hydrogen sulfide is given in the range of 0.7 to 180 μg/m3. In the locality of interest, air pollution contributions to the maximum hourly concentrations of hydrogen sulfide are below 0.14 μg/m3, in the places of the nearest residential development in the range of 0.05 to 0.1 μg/m3. The graphical appendices of the dispersion study show that outside the plant site the values of immission contributions to the hourly maxima of hydrogen sulphide are below 0.12 μg/m3. These values are significantly lower than the lowest declared value of the olfactory threshold of hydrogen sulfide, i.e. 0.7 μg/m3.

5. *Products*

Products

Manganese (EMM)

- *Storage method*: The produced metal manganese, which will be intended for sale, will be packed in 1-ton big bags (building B07). In this building there will be a handy warehouse of packaged metal manganese (capacity up to 20 big bags placed on pallets). The remaining quantity of packaged metal manganese will be stored in the B20 product warehouse.
- *Method of removal*: The produced metal manganese will be transported by rail or truck transport.

Manganese sulphate monohydrate (MSM)

- *Method of storage*: It will be stored in big bags and 25 kg bags in a closed building (B20).
- *Method of transport*: The produced manganese sulphate monohydrate will be dispatched in bulk in road tankers or big bags and in 25 kg bags for rail and truck transport. The tankers will be filled from an operating tank (about 250 t) located in building B17 in front of the packer. Loading will take place using a nozzle with dedusting. For rail or truck transport, the product will be transported in big bags (25 kg, palletized, foiled).

By-products of production

Gypsum (calcium sulphate)

During the Ammonia recoveryprocess, gypsum will be formed as a by-product. This material will be applied to the market.

- *Method of storage:* The material will be stored in a dedicated part of the hall (roofed, impermeable bottom). The storage capacity will be about 2,000 t. The material has a very high humidity (about 30%) and therefore no dust is generated during handling.
- *Method of transport*: This is a bulk material; loading will take place by a horizontal loader on a dump truck. The planned expedition is about 77 cars per week.

Magnesium carbonate MgCO3

In the process step "Mg removal", magnesium carbonate will be produced. This material will be further applied to the market.

- *Method of storage:* The material will be stored in a dedicated part of the hall (roofed, impermeable bottom). The storage capacity will be about 1,500 t. The material has a very high humidity (about 32%) and therefore no dust is generated when handling it.
- *Method of transport*: This is a bulk material; loading will take place by a horizontal loader on a dump truck. The planned expedition is about 45 cars per week.

Manganese dioxide MnO2 (burel)

During electrowinnig, manganese dioxide is produced as a waste substance. The notifier intends to market this material as a by-product. Manganese dioxide is used, for example, in the steel industry, in the production of paints, or in the production of glass, where it is used as a decolorizer (*glass soap*).

6. Additional information

Landscaping

The implementation of the plan is associated with landscaping. Anthropogenically created elements in the landscape will be interfered with. They will be gradually extracted and subsequently recreated. It will be a gradual activity, evenly distributed over 25 years.

The area of the new dumps will be approximately the same as the area of the existing tailings and the intention of the notifier is to maintain approximately the height of these objects. However, the volume of newly deposited material will slightly exceed the volume of mined. Due to this fact and the need to initially free up sufficient space for mining operations, the northern part of the new dumps in the area of tailings pond No. 3 will be higher than at present.

Details are provided in the draft remediation and reclamation plan annexed to this document.

The assessment of impacts associated with landscaping is part of the landscape impact assessment and is described in Chapter D.I.8.

PART C DATA ON THE STATE OF THE ENVIRONMENT IN THE AREA CONCERNED

I. OVERVIEW OF THE MOST IMPORTANT ENVIRONMENTAL CHARACTERISTICS OF THE AFFECTED AREA

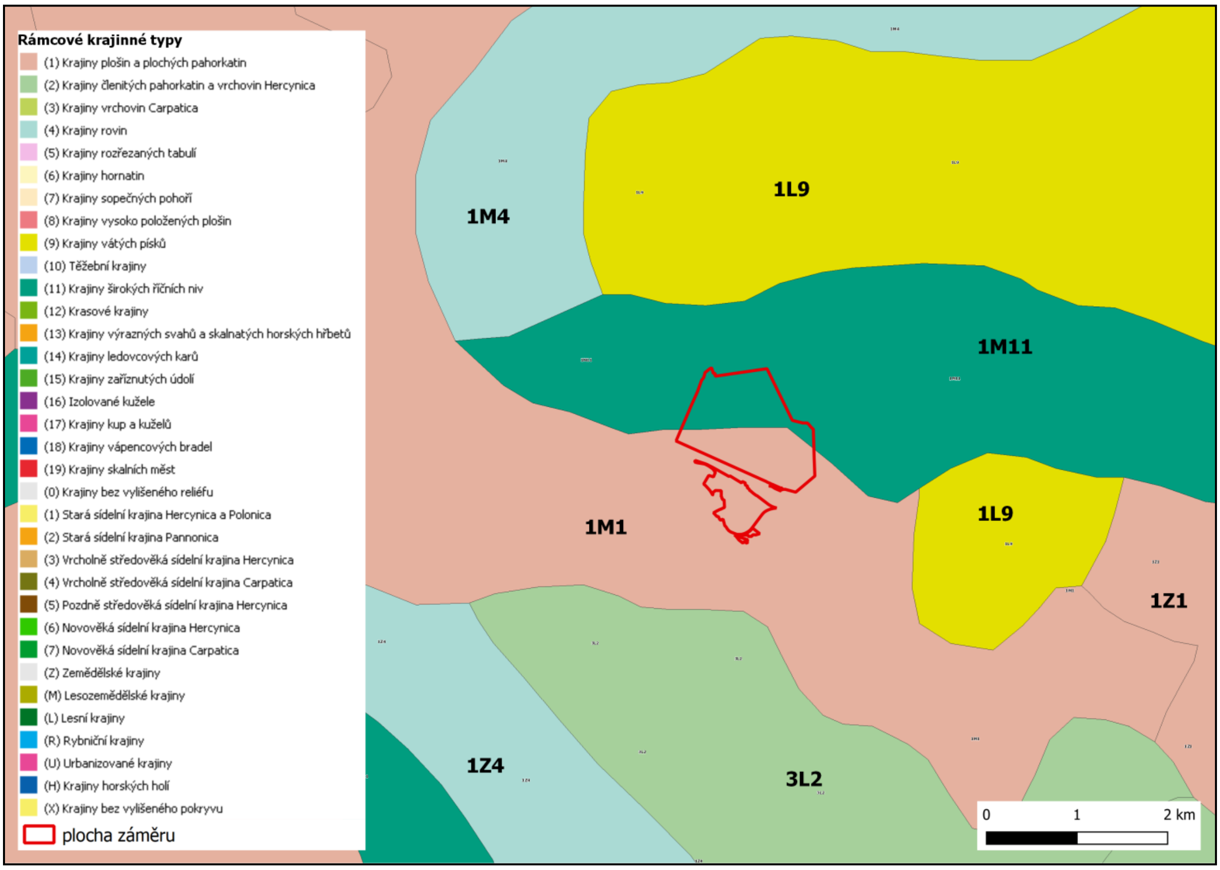
1. Landscape

Landscape type

Within the so-called typology of the Czech landscape, the landscape is divided according to general properties that distinguish the landscape from its surroundings and that connect it with landscapes of similar characteristics.

According to the map Typology of the Czech landscape of the INSPIRE geoportal, the areas of interest are located on the border of landscape types marked 1M1 and 1M11.

Picture no. 50: Localization of the area of interest according to the map Typology of the Czech landscape



Type of landscape according to the character of the settlement: ***Old settlement landscape of Hercynika and Polonika (1)***

This is a type of landscape that has been continuously inhabited since Neolithic times. It occupies the 2nd vegetation stage of Hercynika and the 3rd vegetation stage of Polonika in the Czech Republic. Settlement types of villages are mostly made up of village squares and village squares with false track plains. The area is characterized by a folk type of Czech and Moravian timbered house. Relief of plateaus and hills is common, soft shapes formed by plateaus, basins and flat and rugged hills are characteristic. Agricultural landscapes predominate, rare forest-agricultural and forest landscapes are bound to specific forms of relief (alluvial plains, drift sands), arable land dominates (Löw, 2008).

Type of landscape according to the way of land use: ***Forest agricultural landscapes (M)***

From the point of view of internal structure, it is a heterogeneous, transitional landscape type, characterized by alternation of forest and non-forest habitats. The proportion of areas covered with woody vegetation varies between 10 % and 70 %. The landscapes are mostly semi-open (Löw, 2008).

Types of landscape according to relief: ***Plateau and upland landscapes (1)***
- occupy about 11.57% of the territory

Types of landscape according to relief: ***Landscapes of wide river floodplains (11)***
- occupy about 3.15% of the territory

Characteristics of landscape character

In order to assess the impact of the project on the landscape character, an assessment of the impact of the proposed plan on the landscape character was prepared.(Klouda, 2022)

The impact of the proposed project on the landscape character is always limited to a certain area where the immediate physical effects of the project on the given locality are manifested, or where visual or other sensual influences are manifested. Such a territory is referred to as the Affected Landscape Area (DoKP). In the case of the visibility criterion, the defined landscape area concerned is either carried out by visual barriers (horizons of terrain, forest stands or built-up areas) or by empirical determination of the radius of potential visibility (at two distances: 3 km radius of expected strong visibility and 6 km radius of expected potential visibility).

The definition of the (potentially) affected landscape area as a territory with a possible impact on the landscape character is implicitly based on the determination of the maximum possible visual (or other) reach of the assessed project or phenomenon. This situation applies mainly to projects where there is a high degree of probability of negative (or even across-the-board) impact on the landscape (wind power plants, masts, quarries, buildings situated in exposed places – peaks and terrain edges). In the case of the project assessed here, the definition of the landscape area in question was carried out on the basis of an evaluation of the visibility of the highest located buildings within the projected premises of the processing plant and subsequent corrections made after the field investigation.

The definition of a potential DoKP in the case under consideration here represents a specific task. It is the extraction of secondary or artificially created elevations, which, however, are now incorporated into the landscape image, to which the vegetation cover that has spontaneously expanded on their surface over the past few decades contributes significantly. Another specificity lies in the phasing of planned mining in individual tailings proceeding in different directions. This will cause a different extent of the area visually affected by mining, or its variability over time. Higher above the mining area is a projected processing plant, whose potential visual application in the landscape (to the north) will be influenced by mining in the proposed mining area.

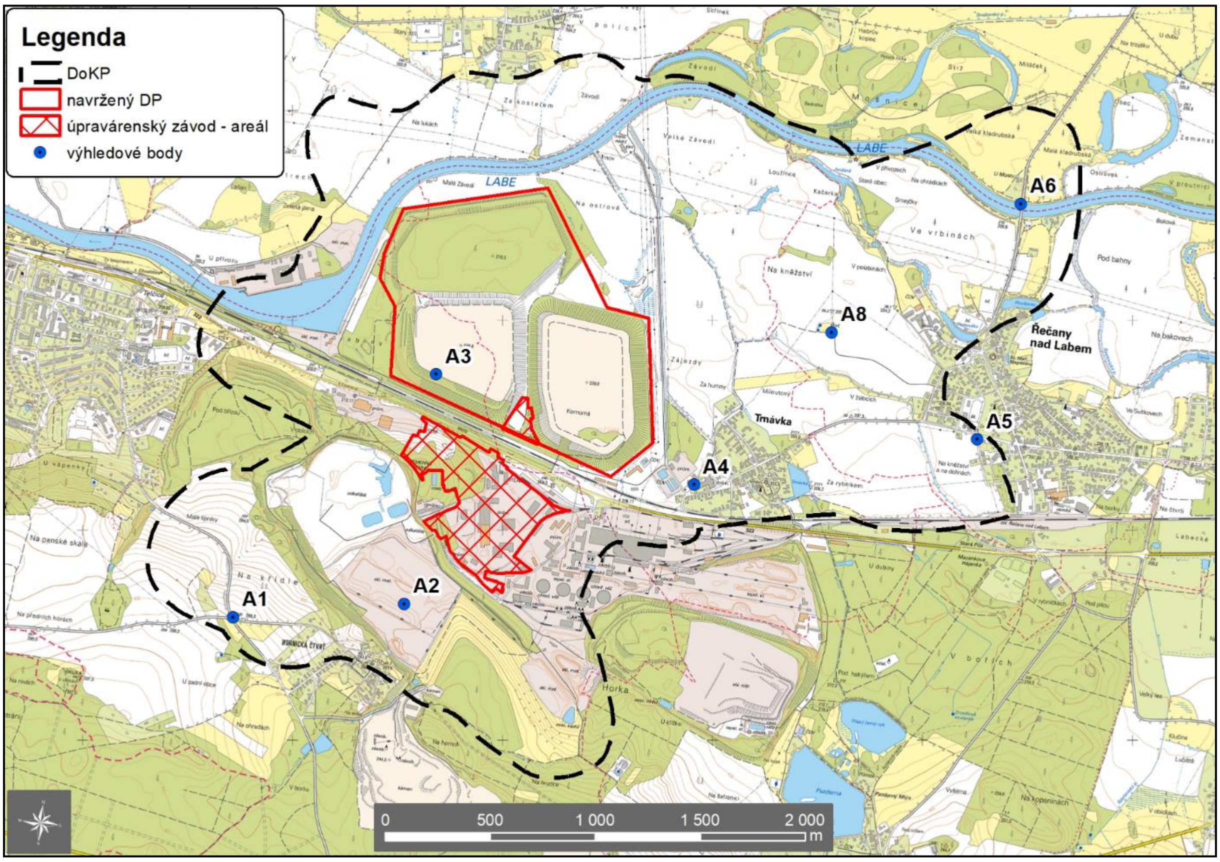
The proposed mining area – the area of the projected mining is located in flat terrain near the left bank of the Elbe, i.e. in the lowest parts of the territory. The visual appearance of the repositories is limited in flat terrain by abundant mature non-forest greenery (in the Elbe floodplain) and forest greenery connecting from the southern side across the railway corridor. As a result of spatially differentiated (phased) mining associated with the removal of vegetation cover, the manifestation of the (exposed) surface of the tailings will be more pronounced than at present – during the implementation of the plan. The manifestation of mining parts of the Elbe floodplain will be limited by the numerous non-forest greenery scattered in the vicinity. The area of the tailings is visible even in distant views – from higher deforested positions on the peripheral slopes of the Iron Mountains. In reality, it is a small open segment of the area on the slopes of Oklika west of the Hornická čtvrť. A potential viewing point is the top part of the Chvaletice waste dump, but without the possibility of free access.

The visual application of the projected area of the processing plant will occur mainly towards the north or northeast into the open parts of the Labe floodplain around Trnávka and Řečany nad Labem and also in the top part of the manganese ore tailings, which will also act as an optical barrier (for more details, see chapter 12.3). The proposed processing plant will also be visually applied to the southern directions – in a smaller segment area south of the Hornická čtvrť, from the area of the fly ash tailings and further up the deforested slope to the road intersection – at Chvaletická vyhlídka, or from the waste dump south of the Chvaletice power plant. In addition to the above-mentioned continuous area, there are remote viewing points with a functional visual link to the construction site in question. These are partial locations in the vicinity of Uhlířská Lhota and Rasoch northwest of the locality of interest.

The masses of operational buildings of significant ground plan dimensions and verticals within the projected processing area situated in the lower parts of the marginal slopes of the Iron Mountains have the potential for wider visual application – towards the flat terrain around the Elbe. In addition to the tailings (see above), the factor fundamentally limiting the visual expression of the processing plant will be the abundant non-forest greenery, even outside the growing season. Its abundant representation and spatial extension (dispersion) will not allow the visual application of the proposed processing plant, among other things, in the area of the Kladruby stud farm.

A plot of the landscape area in question is shown in the picture (Picture no. 51). The landscape area in question shown on the basis of the base map represents the potential extent of the area in which the visual application of the assessed project, including planned mining and industrial development of the processing plant, can be considered. In the partial parts of the defined potential DoKP, the proposed intention will not be visually applied. These are parts behind optical obstacles (non-forest greenery) or located inside a continuous forest greenery, or in a built-up area from where visibility of the proposed project will not be possible.

Picture no. 51: Defined DoKP



In relation to the subject of the assessment, the main features or values of the landscape character in the area of interest are, from the point of view of natural characteristics:

- Sloping relief at the crossing of the Elbe floodplain and the marginal slopes of the Iron Mountains,
- Elbe – an important watercourse,
- Small streams, tributaries of the Elbe,
- Occurrence of valuable wetland habitats, blind shoulders,
- Dominance of agricultural land, low forest cover in the vicinity of the Elbe,
- Abundant non-forest greenery in relation to water bodies and communications,
- Considerable anthropic pressure on the natural sphere (modification of the river network, interventions in terrain morphology, spontaneously expanded vegetation, ruderalization)
- Chvaletice-Trnávka tailings – a large anthropogenic element in the Elbe floodplain.

The flow of the Elbe represents a sign (value) of a natural characteristic of a unique value.

From the point of view of cultural and historical characteristics, the following stand out as the main features and values of the landscape character of the territory:

- Ancient settlement of the area documented by rich archaeological finds,
- Long-term prevailing agricultural focus of the territory,
- Historical landscaping in the surroundings of Kladruby nad Labem; unique tradition of horse breeding (stud farm Kladruby),

- Transit character of the territory (railways, water transport),
- Tradition of shipping on the Elbe,
- Fundamental development of the landscape (extinction of settlement, industrialization) in the second half of the 20th century,
- Long-term presence of mining activity,
- Chvaletice Power Plant,
- Occurrence of unused (abandoned) areas (brownfields),
- The presence of traditional cultural-historical dominants.

Landscaping, the tradition of horse breeding in Kladruby and traditional cultural-historical landmarks represent signs of cultural-historical characteristics of unique valuables.

In the category of aesthetic values, spatial relations and harmony of the territory – visual characteristics of the territory, the following main features of the territory can be identified:

- The flow of the Elbe – a distinct natural axis of the territory,
- The prevailing horizontal scale in spatial relations; large areas (blocks) of agricultural land,
- Marginal slopes of the Iron Mountains, gentle wooded horizon,
- Composed landscape around Kladruby nad Labem,
- Abundant occurrence of scattered greenery (in relation to water bodies and the road network) dividing the landscape structure,
- Aesthetically valuable harmonious parts of the river landscape – along the Elbe,
- Industrial dominant of the Chvaletice power plant with a visual range,
- Railway corridor, road II/322 – secondary artificial axis of space, barrier,
- The dominant feature of the evangelical church in the Hornická čtvrť,
- Dense network of electrical wiring – artificial linear elements with vertical dimension,
- Disturbed harmonious relationships and harmonic scale in the territory, obvious industrial perception (technicist dominants, dumps, tailings).

The composed landscape around Kladruby nad Labem and the manifestation of the local dominant of the evangelical church in the Hornická čtvrť represent the signs of the visual characteristic of a unique valuable.

The degree of impact of the project on the landscape character is assessed in Chapter D.I.8.

Geomorphological characteristics

From the geomorphological point of view, the territory is part of:

System:	Hercynian
Province:	Czech Highlands
Subprovinces:	Czech board (VI)
Area:	East Bohemian Table (VIC)
Whole:	East Elbe Table (VIC-1)
Subunit:	Pardubice Basin (VIC-1C)
District:	Kunětice basin VIC-1C-b

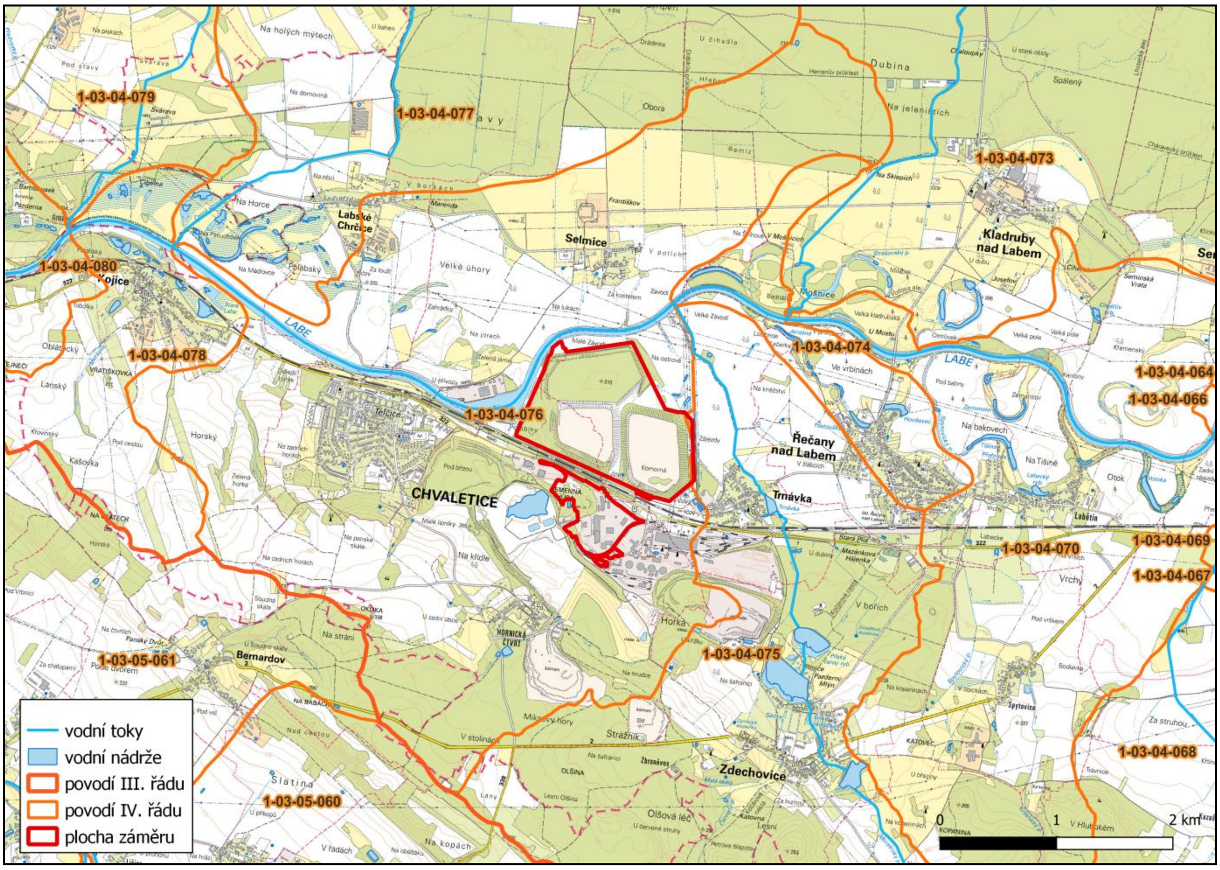
The Kunětice Basin is a non-tectonically conditioned erosion-accumulation depression with an area of 68.68 km2. The river terraces and alluvial plains are now filled with sediments of Early Pleistocene and Middle Pleistocene age and form an accumulation georelief. The highest point is Kunětická hora 306.8 m. On the territory there is an extensive depression Bohdanečská gate, representing the deserted valley of the Elbe from the Würm period.

Hydrological characteristics

The most important watercourse in the area is the Elbe, which flows around the tailings along the northern and western edges at a distance of about 100 m. Several small streams flow through the area east of the tailings, which drain the northeastern slopes of the Iron Mountains, respectively the area of the Chvaletice power plant, and which form the left tributaries of the Elbe.

According to the hydrological division of the Czech Republic, the area of interest is part of the main Elbe River basin (III. order catchment, Elbe from Chrudimka to Doubrava, ČHP 1-03-04), its sub-basins of the IV. order 1-03-04-0760 and 1-03-04-0750 (Morašický stream).

Picture no. 52: Localization of the project according to the map of hydrological catchments



According to the flood plan of the village Trnávka (2019), the average annual flow of the Elbe in river km. 941,532 is around 59.2 m3/s, the minimum flow drops to 17.2 m3/s. The mean level of the Elbe is around the elevation of 201.5 m above sea level, at the flow rate Q100 the level reaches the level of 205.2 m above sea level. From the flow of Q20, there is a significant overflow of the Elbe into the surrounding floodplain in the area of interest and the rising water level reaches to the edges of the tailings. Basic hydrological data related to the Elbe profile for river km. 941,532 is summarized in the following table (Table No. 73).

Table No. 73: Elbe river 941,532 - hydrological data (Flood plan of Trnávka)

Parameter	Flow rate [m3/s]	Level dimension [m asl]
Q355	17	
Qprům	59,2	
Q1	285	202,618
Q5	502	204,200
Q20	705	204,810
Q100	956	205,207
Qextr	1243	205,681

The M-daily flows in the following table are provided to CHMI for the profile in r. km. 939,445 and are derived from observed flows in water meter stations for the reference period 1981-2010. The resulting values in this profile are influenced by anthropogenic activity.

Table No. 74: Elbe River km. 939,445 – M-day flows and N-year flows (CHMI)

M-daily flow rates QMd													
M	30	60	90	120	150	180	210	240	270	300	330	355	364
QMd [m3/s]	131	92.8	73.5	59.2	49.6	41.9	36.0	30.9	26.7	23.1	20.2	17.1	13.5

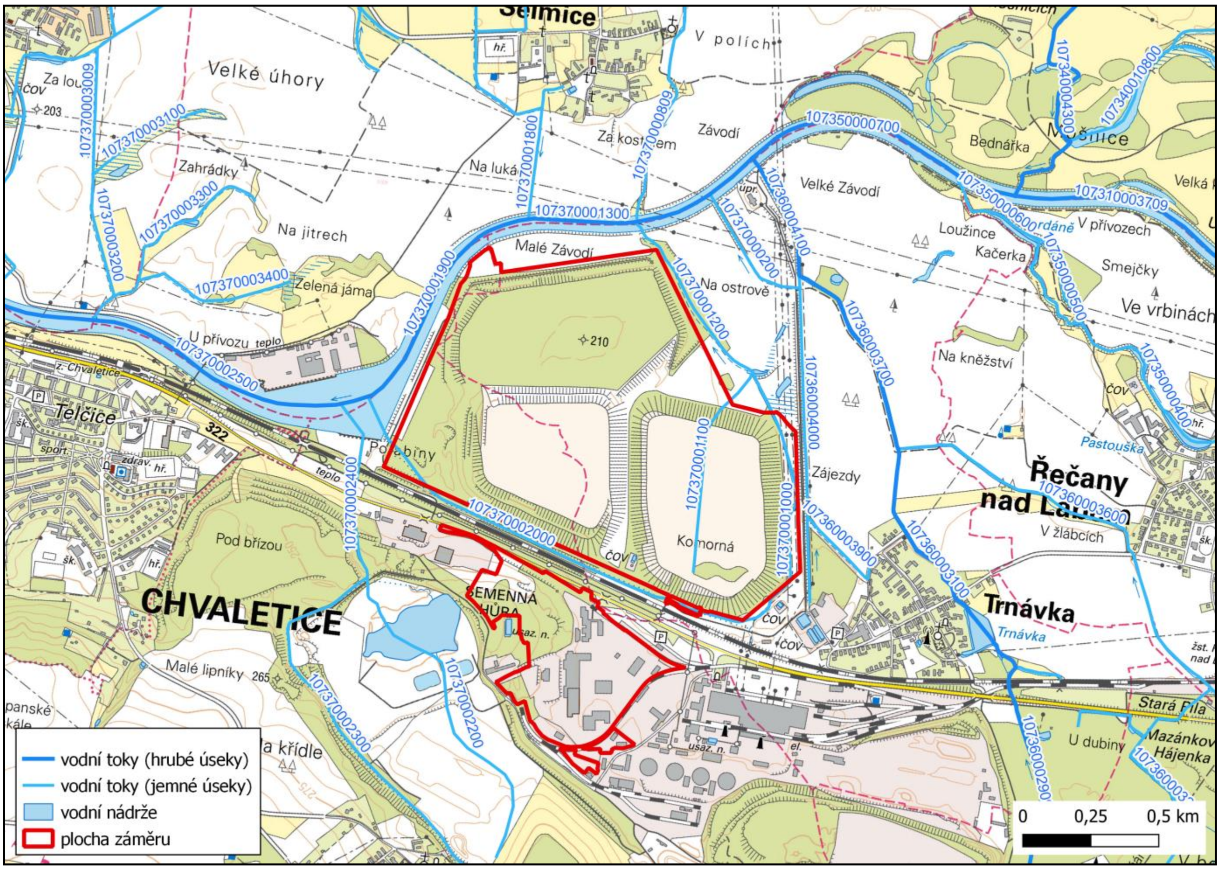
N-year flow rates QN							
N	1	2	5	10	20	50	100
QN [m3/s]	288	379	507	608	712	854	966

In the area of interest and in its vicinity, several small watercourses are registered in the HEIS VUV information system. In the case of streams in the immediate vicinity of the project, these are rather anthropogenically formed or modified ditches, which are partly waterless, or serve to divert treated water from the WWTP. A small watercourse marked ID 107370001100 is represented by an anhydrous ditch in the terrain at the top of the tailings pond No. 2, but on the slope of the heap and further north to the stream with ID 107370001000 no longer exists at all. An overview of watercourses in the vicinity of the project is given in the following table.

Table No. 595: Overview of flows around the project area

Flow ID	Flow name	Flow length [m]
in the project area		
107370001100	-	796
107370001000	-	1244
107370002000	-	1477
in the vicinity of the project		
107370000200	-	1477
107370001200	-	716
107370002200	-	1275
107370000100	-	470
107360003800	-	313
107360003900	-	405
100010000100	Elbe river	213091
107360000100	Morašický stream	1248

Picture no. 53: Localization of the project according to the map of watercourses



2. *Determinative components of flora and fauna*

Biogeographical breakdown

According to the biogeographical division of the Czech Republic, the project is located in the bioregion Pardubice 1.8. (Culek, 2003)

The bioregion lies in the middle of Eastern Bohemia, occupying their central, lowest part, the so-called. Pardubice basin is stretched along the rivers Elbe and Loučná and has an area of 594 km2.

It is found in slightly cooler and wetter eastern Bohemia. A typical cathena of the bioregion are alluvial plains with alluvial plains and peat alders, followed by low and middle terraces with pine oak woods and fens. The biota belongs to the 2nd, beech-oak and 3rd, oak-beech grades. Similar communities are represented as in the Labe bioregion (1.7), but without the participation of most thermophilous species, on the contrary with the presence of subatlantic species. Remarkable is the occurrence of Central European endemic tree Melampyrum bohemicum. Unrepresentative parts are protruding isolated marl hills and neovolcanic Kunětická hora with thermophilous oak woods and oak-hornbeam groves, as well as areas less typically developed, with clay terraces with groves and floodplains into the surrounding bioregions. In the current landscape, cultural pine trees on terraces and alder trees in waterlogged depressions are characteristic. Typical is the representation of fens and ponds with adequate flora and fauna. Arable land predominates, a considerable area is occupied by larger settlements.

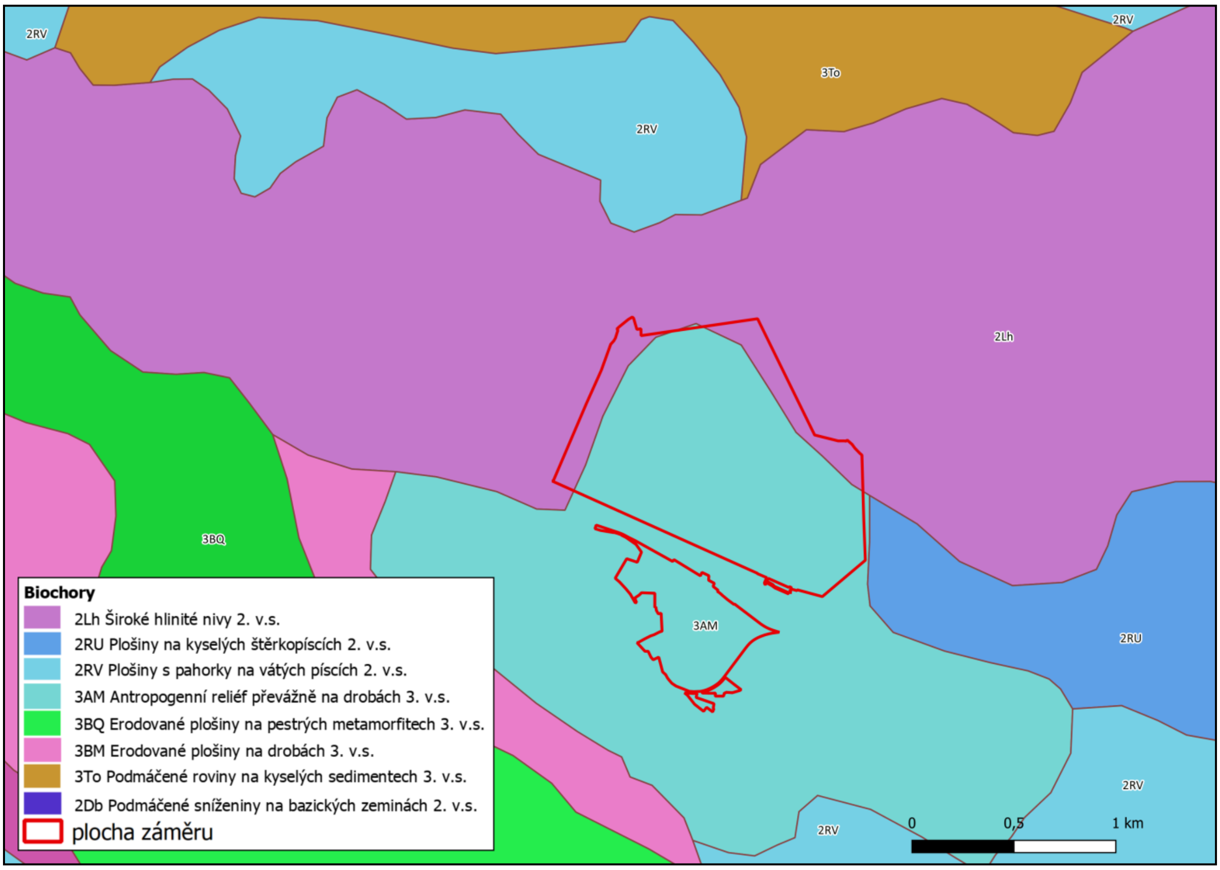
The geological subsoil in the bioregion consists of Upper Turonian marls and marlstones, but these are almost entirely covered by Quaternary sediments - low gravel-sand terraces and alluvial plains. In places, gravel sands on the surface are blown into drift sands. 3 smaller bodies of non-volcanites break through these rocks. Significant are the deposits of humolites - fens, especially in the vicinity of Bohdaneč.

The flat relief is formed by alluvial plains and several m above them protruding Pleistocene terraces (grades VII and VI). In the floodplains there are small shapes - dead shoulders, edges of terraces, and on terraces and sand dunes. A special shape is the rocky, but shallow and short gorge of the Elbe near Týnec n/L. A significant elevation exceeding the surrounding plain by 60 m is the lacolite of Kunětická hory. However, rocky shapes are typically absent in the bioregion, with the slight exception of Kunětická hora and the aforementioned gorge. The relief is classified into plains with a height segmentation of up to 30 m, making it one of the flattest in the Czech Republic. Only the area of the exposed neovolcanic knot of Kunětická hora has a relief of rugged hills with an elevation of up to 100 m, other neovolcanites are not morphologically manifested. The lowest point of the bioregion is at Týnec n/L. elevation about 200 m, the highest Kunětická hora with a height of 306 m. The typical height of the bioregion is 200 - 240 m.

The Elbe floodplain is dominated by the typical fluvizem (vega type), which has a strikingly red tint (the so-called Elbe redhead), given by flushing from the Podkrkonoše Permian. Poor (oligobasic) arenic cambisols to cambisol podzols developed on extensive gravelbeds, underdeveloped soils of the acid ranker type on drift sands. In flat, poorly drained places along some tributaries of the Elbe, blackberries, more or less gleyed, developed on carbonate alluvial sediments. Small but characteristic areas are organosols of the fen and slatí types, mainly around Bohdaneč, where gleys are more abundant. On Kunětická hora and in the Elbe gorge, stony rankers are developed on small areas.

Most of the area of interest is described by biochora 3AM Anthropogenic relief of mines and dumps 3. v. s, the marginal part belongs to the biochora 2Lh Wide loamy floodplains 2. v. s.

Picture no. 54: Localization of the project in the biochor map



Biochory 3AM is found scattered in the northern half of the state, in relation to mineral extraction associated with large surface deposition of material. The area of the type is constantly growing with the advancing extraction and disposal of waste. The following figures are approximate. In total, the type consists of 12 segments with an average area of 5.1 km2 and a total area of 62 km2. The largest area is in the Ostrava bioregion (2.3), where it is located 36 km2, even in medium-sized segments.

The relief is very diverse. Surface flat accumulations predominate, some of which only slightly protrude above the surroundings and often merge with it visually. In a minority of cases, however, they have the shape of table mountains up to 50 m high.

Current land use in biocha 3AM: Forests: 14 %, grass 6 %, water 3 %, fields 2.5 %, orchards 1.5 %, settlements 10 %, other 63 %.

The use of land in this type is very unsettled. On the one hand, the area of the type is constantly increasing, on the other hand, it is subject to reclamation and spontaneous air raids, pinks are created during the subsidence of the terrain in the Ostrava region, which are subsequently used as tailings for power plants.

The forests are located mainly within the largest segment near Orlová. These are mainly remnants of vegetation between expanding dumps and sludge. These forests are medium-sized and are spruce and alder, ash, sometimes with oak and birch. In other segments, if there are forests or spontaneously emerging stands at all, these forests are only small, mostly deciduous - willow, poplar, alder and birch. A small part of the area has also been reclaimed and then there are mostly young deciduous stands (poplars, ashes, maples and exotic trees).

Grasslands are located on abandoned areas and often have a ruderal character with a raid of shrubs. There are also mostly abandoned remnants of meadows, not yet buried by heaps, and wetlands near water bodies.

Water areas are mainly in the Ostrava region. These are the remains of ponds and pools, not yet used as a sludge. They are small and medium in size. The resulting representation of water areas is uncertain, but it can be expected that their area will not increase significantly (unlike the -2AN type). At present, large mud ponds are mainly water areas.

The fields are represented here quite marginally by the still living settlements in the Ostrava bioregion. The orchards are also bound to the edges of settlements in the Ostrava bioregion and are small. Settlements are to a lesser extent represented by surviving settlements, rarely also newly based on old, stabilized accumulations in the Ostrava region. However, industrial plants and power plants dominated by high chimneys (Chvaletice - 300 m) prevail here.

Most of the area is unclassifiable surfaces such as landfills, transshipment points, railway stations and, above all, fresh accumulations of waste material.

Biochory 2Lh is located in the Hercynian subprovince along the Elbe, lower Vltava, Ohře and Berounka and the Western Carpathian subprovince in Central Moravia. Segments of this type of biochora are among the largest in the country, only less typical segments in the valley of the Vltava and Berounka in Prague have a smaller area. The largest is the segment, which occupies almost the entire Kojetín bioregion (3.11) and has an area of 300 km2; a large area is occupied by type I in the Polabský bioregion (1.7), where it lies 223 km2. Together the type consists of 5 segments with an average size of 128.8 km2 and a total area of 641 km2.

The shape of the segments is significantly elongated with a length of over 100 km. The width of floodplains in the Hercynian subprovince is on average only 1-3 km, in the Western Carpathian 2.5-12 km. The relief of floodplains is typically flat, with height differences of up to 10 m per 12.56 km2. In detail, however, the relief is articulated by very flat and therefore indistinct elevations of bank ramparts and remnants of terraces, as well as smaller and more prominent dead arms. The most conspicuous shapes today are those of anthropogenic origin - dams, embankments, drainage ditches and extensive gravel pits flooded with water.

Current land use in biochra 3Lh: Forests 19.5%, grasslands 10%, water areas 8%, fields 50.5%, orchards 2%, settlements 5%, other 5%.

This type of biochora originated exclusively along large rivers, with major floods of regional magnitude and the contribution of material from remote spring areas. Therefore, sediments are generally non-calcareous. The geological structure is basically simple and similar in all segments. The subsoil consists of Pleistocene and Old Holocene gravel sands and on them rests a 1-5-meter-thick layer of flood sandy loams. In detail, however, the structure is very variable, with different sandiness and calcareousness of individual layers, complemented by organogenic sediments deposited in former dead arms.

The soils in the Hercynian subprovince are mostly typical fluvials, on the bank ramparts more sandy and lighter, in the depressions near the edges of the floodplain there are small localities of gley fluvises and exceptionally gleys. Under the mouths of tributaries from the area of loess or marls (e.g. Cidlina), typical blackberries are developed on calcareous alluvial deposits. In the Western Carpathian subprovince, due to larger and until recently regular floods and due to the contribution of fine-grained material from flysch and loess areas, heavier gley fluvises, weakly carbonate, dominate. Only on the banks of Bečva are typical fluvises, grain lighter. Gleje are very rare. Soils have a brownish-gray color, due to increased humidity, as a rule, darker. In the Pardubice bioregion (1.8) due to the contribution of soils from the Permian of the Krkonoše Mountains, the soils are reddish.

After the regulation of rivers at the beginning of the century, fields dominate, although in the last century meadows prevailed. The fields are located in large units, often separated by ditches with wetland vegetation and poplar trees.

Forests are divided into medium-sized units, small forests are rarer, especially along Moravia. The forests have a high proportion of natural tree composition, with abundant penduncculate oak, ash and poplars, but the elm almost disappeared after the graphiosis attack. Willows are found on the edges of forests and mainly near dead shoulders. Poplars form cultures and dominate mainly in small forests. Alders are found in the wettest places of floodplains. Unfortunately, in the last fifty years, the introduction of hybrid poplars and black walnut has become frequent.

The water areas consist mainly of river levels and, to a significant extent, flooded gravel pits. There are relatively few ponds, they are more abundant in the Kojetín bioregion, along the Elbe there is a larger number of dead arms. In the Pardubice bioregion (1.8), the weaned arms are part of the Labské rameno Votoka OW, the Hrozná Nature Reserve, the Labiště pod Otočínkem Nature Reserve, the Tůň u Hrobic Nature Reserve, the Polabiny Nature Reserve, the Mělické Labiště Nature Reserve.

Orchards are very rare and consist mainly of gardens on the outskirts of settlements. Settlements are usually spread on the edges of floodplains, but after the regulation of rivers they grew into floodplains. In the floodplains, there are mostly buildings from the 20th century. Cities are particularly abundant, including the seats of VÚSC (Pardubice, Hradec Králové, Olomouc) and the capital city of Prague (Culek et al., 2003).

Phytogeographical breakdown and potential natural vegetation

The area of interest is located according to the phytogeographical division in the phytogeographical district 15c of the Pardubice Elbe region.(Skalický, 1988)

According to the map Potential Natural Vegetation of the Czech Republic (Neuhäuslová, 2001), the original vegetation in the northwestern part of the territory consisted of mapping vegetation formations of elm oak wood, in the southeastern part of the bek and/or fir oak wood.

Elm oak woods (*Querco-Ulmetum), cherry ash (*Pruno-Fraxinetum) at *the lowest elevations,* in places in complex with wetland alders (*Alnion glutinosae*) sv. *Alnion incanae*, or on drier sites linden oak-hornbeam (*Tilio-Carpinetum*), sv. *Carpinion*. Natural vegetation has not been preserved in the affected area.

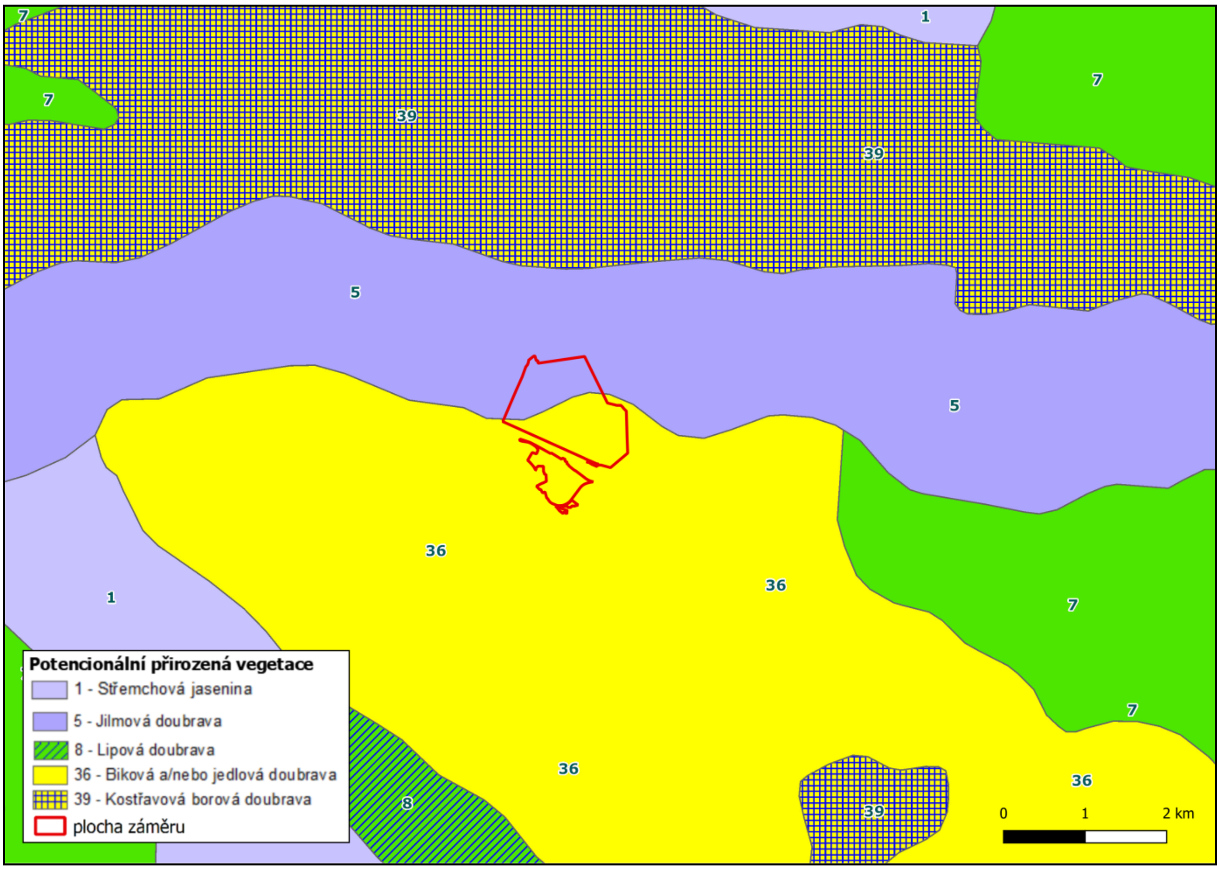
Elm oak woods usually form three-storey phytocenoses with dominant penduncculate oak (*Quercus robur*) or ash (*Fraxinus excelsior*) in the tree layer. Ash is often strongly preferred economically. On the contrary, the proportion of elms (*Ulmus minor*, *U. laevis*), typical hardwood species, has recently declined due to graphiosis. A frequent admixture consists of heart-leaved linden *(Tilia cordata*), in the wetter variant also alder (*Alnus gluti-nosa)* and other typical woody species of soft meadow, in the drier variant hornbeam *(Carpinus betulus*) or maple babyka (*Acer campestre*). The shrub layer is species rich. In addition to rejuvenated trees of the tree layer, *Swida sanguinea appears most often,* in wetter types Padus *avium*, or. *Sambucus nigra.* The herb layer usually consists of a distinctive aspect of spring geophytes dominated by *Ficaria bulbifera* (in wetter types), Corydalis cava, Anemone nemorosa, Allium ursinum, Leucojum vernum, *Galan-thus nivalis* or *Scilla vindobonensis,* in the Odra floodplain also *Dentaria glandulosa*. The most common components of the summer aspect are

Aegopodium podagraria or *Urtica dioica* (the last again in the wetter wing of the association). The moss layer is mostly negligible.

Beech oak with dominant winter oak is characterized by a weaker admixture to the absence of other deciduous birch, beech, hornbeam, rowan and lime heart. In drier habitats, pine appears as an admixture. Summer oak appears in relatively humid places. Rejuvenated trees of the tree layer are the most important component of the shrub layer, where alder bush and common juniper also occur more frequently. The character of the herb layer is determined by (sub)acidophilous and mesophilic forest species of meadow grass *(Poa nemoralis*), meadow grass (Luzula luzuloides*), blueberry (*Vaccinium myrtillus*), lily of the valley* (Convallaria majalis*), sheep's fescue (*Festuca ovina*), meadow black (*Melampyrum pratense) and others. The moss layer is varied. *Polytrichum formosum*, Schreber's grass (*Pleurozium schreberi*), *Dicranum scoparium and* Leucobryum glaucum *often appear in it*.

A similar species formation is typical for fir oak woods (*Abieti-Quercetum*), indicated not only by the occurrence of oaks but also by the presence of fir in the tree and shrub layers. In the herb layer we can find the round-leaved woodcreeper *(Galium rotundifolium*), hairy whip (*Luzula pilosa*), ringed sedge (*Carex digitata),* broad-leaved helleborine *(Epipactis helleborine*), sour oxalis (Oxalis *acetosella*), Fuchs's elderberry (*Seneci fuchsii*) and fir seedlings. Frequent occurrence of elderberry in the shrub and herb layer. Both associations represent eratic climax on nutrient-poor substrates in the hilly stage with a subcontinental climate. The soils usually correspond to mezooligotrophic to oligotrophic cambisols or luvisors, under fir oak woods sometimes pseudo-gleyed. Bek oak woods also inhabit soils that sometimes dry out, fir oak woods moist to freshly moist substrates. Growing pine with an admixture of amelioration trees is suitable. On the contrary, grown spruce is not profitable, although its growth tends to be good on moister soils, often suffering from fungal diseases.

Picture no. 55: Localization of the area of interest according to the map of potential natural vegetation



Flora of the bioregion

The potential vegetation of the bioregion is mainly floodplains, belonging to the *Ficario-Ulmetum campestris association*, along smaller watercourses perhaps also *Pruno-Fraxinetum*. On the higher gravel-sand terraces there are acidophilous oak woods (*Genisto germanicae-Quercion*), probably with autochthonous pine. Oak-hornbeam forests (*Melampyro nemorosi-Carpinetum*) have an exclave occurrence, only on tertiary effusions of Kunětická hora. Vegetation from the *Alnion glutinosae alliance* (especially *Carici elongatae-Alnetum) is captured in the fen sites*. The primary forest-free vegetation is probably represented by some types of fen vegetation from the *Caricion davallianae alliance and* some types of wetland vegetation (*Phragmition communis*) and aquatic vegetation. The natural replacement vegetation of the bioregion is represented by the meadow vegetation of *the Calthion* and *Molinion alliances, which passes into the vegetation of the* Caricion davallianae *alliance in humolite deposits*. In dry places on the sands, on the contrary, vegetation of the *Plantagini-Festucion ovinae* and *Corynephorion alliances appears*. The shrubs belong mostly to the *Prunion spinosae alliance.*

The flora of the bioregion consists of an impoverished species composition of the vegetation of the Elbe alluvia, supplemented by some sub-Atlantic species, such as the grey wormwood *(Corynephorus canescens*), the common grass (Armeria vulgaris) *and the umbilical cord (*Hydrocotyle vulgaris), *the Baltic one, such as the sand-loving squirrel* (*Vignea pseudobrizoides*), or the Sarmatian one, represented by the astragalus *(Astragalus arenarius*)). Noteworthy is the occurrence of the Central European endemic species *Melampyrum bohemicum*. Interesting species occur mainly on the remains of fens, such as Loesel's tuber (*Liparis loeselii*) and meadow gooseberry (*Arabis nemorensis*).

Fauna of the bioregion

The bioregion occupies a heavily modified area of the Labe floodplain, with only remnants of larger forest complexes and typical impoverished fauna of lowland locations of Hercynian origin or wide distribution (raven, river cricket). On the terrain elevations there are fragments of dry fauna (pipit). An enriching element are large ponds, important especially for water and wetland birds (gulls, corncrake, bearded) and amphibians. The Elbe and its larger tributaries belong to the bream zone, but the biota in the Elbe below Pardubice is decimated by pollution.

Important species - Birds: corncrake (*Porzana parva*), meadow flycatcher (*Remiz pendulinus*), gull (*Larus ridibundus*), pipit (*Anthus campestris*), river warbler (*Locustella fluviatilis*), bearded (*Panurus biarmicus*), raven (*Corvus frugilegus*). Amphibians: marsh frog (Rana *ridibunda*), sharp-nosed frog (*Rana arvalis*). Molluscs: Wrinkled shrub (*Euomphalia strigella*), garden snail (*Helix pomatia), amber (*Succinea putris*), fawn shrub (*Bradybaena fruticum*), club-like frog (*Clausilia pumila*), slimy tunate (*Myxas glutinosa*),* northern marsh (*Stagnicola occulta*). Insect: *Zygaena laeta*. Crustaceans: gill legs *Siphonophanes grubii,* Branchipus *schaefferi, leaf nosed* Lepidurus, Apus, Ostracoda *clams*.

The fauna and flora of the area of interest were investigated during field surveys, the results of which are presented in Chapter C.2.5.

3. Territorial system of ecological stability (USES)

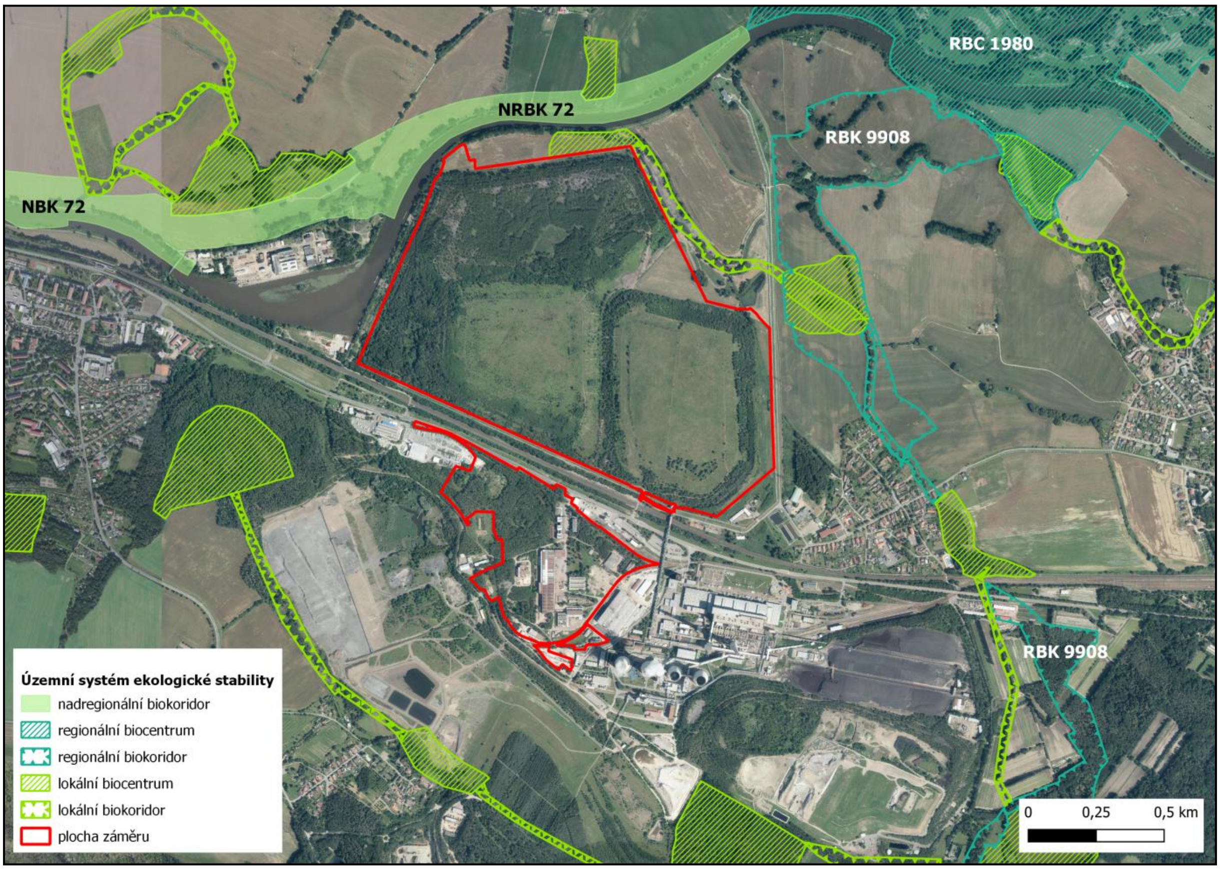
Act No. 114/1992 Coll., on Nature and Landscape Protection, as amended, defines the territorial system of ecological stability as an interconnected set of natural and modified, but close to nature ecosystems that maintain the natural balance. A distinction is made between local, regional and supra-regional systems of ecological stability. The constituent parts of the ÚSES are biocentres, biocorridors and interaction elements.

The elements of the ÚSES in the vicinity of the project were verified according to the territorial analytical documents (ÚAP) for the ORP Přelouč (available online version after the 5th update, 2020), the Chvaletice Urban Plan, the Trnávka Municipal Office, the Řečany nad Labem Municipal Planning Office and the Selmice Municipal Planning Office.

None of the elements of the ÚSES are located directly on the project area. In its immediate vicinity lie the following elements:

- The axis of the supraregional biocorridor NRBK 72 (Polabský luh – Bohdaneč) about 100 m north of the project.
- Regional biocorridor RBK 9908 (Řečany – RK 1327) about 100 m east of the project.
- Regional biocentre RBC 1980 (Řečany) about 600 m NE from the project.
- Other local biocentres (LBC) and local biocorridors (LBK) in the vicinity of the project, see the picture below.

Picture no. 56: Localization of the intention and ÚSES according to ÚAP ORP Přelouč (5th update, 2020)



4. *Specially protected areas*

According to Section 14 of Act No. 114/1992 Coll., on Nature and Landscape Protection, the categories of specially protected areas (SPAs) are as follows:

- large-scale specially protected areas (VZCHÚ): national parks (NPs), protected landscape areas (PLAs),
- small-scale specially protected areas (MZCHÚ): national nature reserves (NNR), nature reserves (PR), national nature monuments (NPP) and natural monuments (PP).

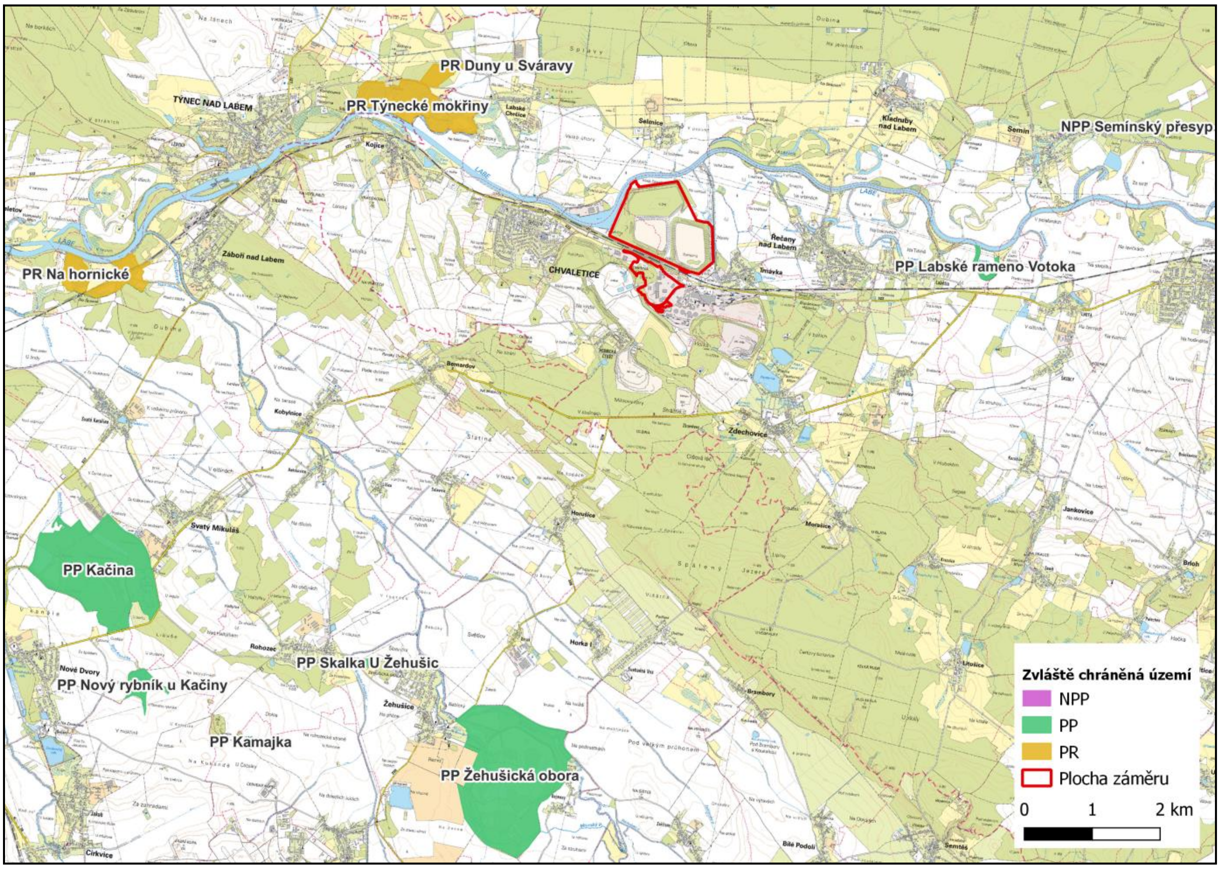
None of the above-mentioned types of specially protected area can be found in the area of interest or in its vicinity. The nearest small-scale specially protected areas are listed in the table below. The nearest large-scale SPA is the Železné hory PLA (about 12.5 km south of the project).

Table No. 606: Overview of small-scale specially protected areas in the vicinity of the project

Small-scale specially protected areas in the vicinity of the project	
National Nature Reserve (NNR)	x
Nature Reserve (PR)	PR Týnecké mokřiny
	PR Na hornické
	PR Duny u Svárava
National Natural Monument (NPP)	Semínský přesyp NNM

Natural monument (PP)	PP Kacina
	PP Nový rybník u Kačina
	PP Kamajka
	PP Skalka u Žehušic
	PP Žehušická obora

Picture no. 57: Localization of the project according to the map of specially protected areas



5. *Natura 2000 Sites and Bird Areas*

Natura 2000 is a network of sites protecting the most endangered species of flora and fauna and natural habitats (e.g. peatlands, rocky steppes or mountain spruce stands, etc.) in the EU.

A Site of Community Importance (SCI) is legislatively based on Act No. 114/1992 Coll., Nature and Landscape Protection, which implements the European Habitats Directive (92/43/EEC). A Site of Community Importance is included in the so-called national list by a decree of the Government of the Czech Republic. After approval by the European Commission, it is registered in the so-called European list. Bird Areas (POs) are protected areas designated for the purpose of protecting birds. They are created on the basis of Directive 2009/147/EC and, together with Sites of Community Importance, form the NATURA 2000 network. Individual bird areas in the Czech Republic are declared separately in the form of a government regulation.

None of the elements of the Natura 2000 network interferes with the area of interest. In the vicinity of the project there is EVL Louky u Přelouče about 170 m west, EVL Kladruby nad

Labem, about 1 km north and EVL Týnecké mokřiny about 2.4 km northwest. The nearest PO is Bohdanečský rybník, located about 15.5 km NE from the area of interest.

The locality of EVL Louky u Přelouče was declared by Government Decree No. 29/2020 Coll. of 20 January 2020. The total area of the site is 133.5 ha. However, the EVL consists of several separate enclaves in the cadastral areas of Břehy, Kladruby nad Labem, Labětín, Lohenice u Přelouče, Mělice, Přelouč, Řečany nad Labem, Selmice, Semín, Valy nad Labem. In relative proximity to the project there is an enclave with an area of about 13.7 hectares.

Picture no. 58: Location of the project according to the map of Natura 2000 sites (AOPK, 2022)

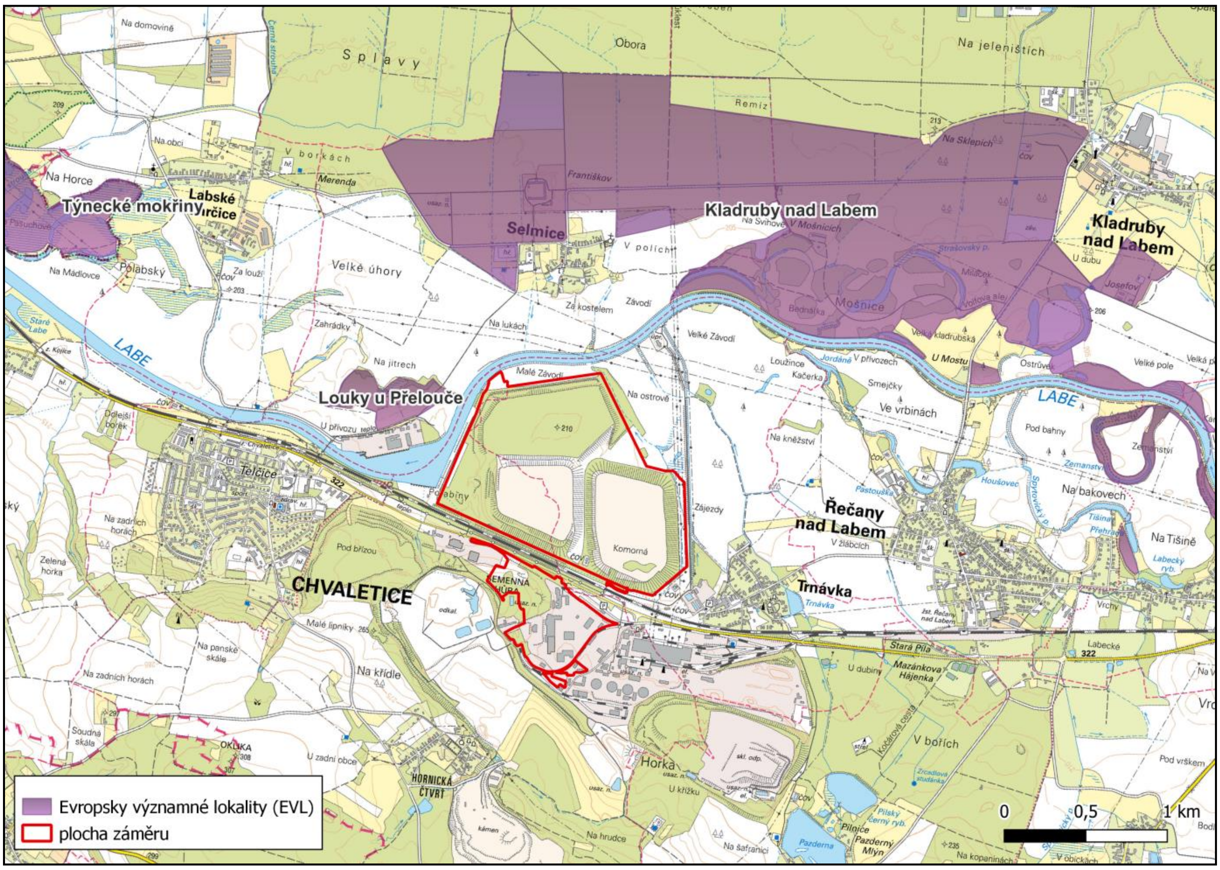


Table No. 77: Characteristics of EVL Louky u Přelouče

EVL Louky u Přelouče		
Site Code:		*CZ 0537011*
Area:		*133.5 ha (near the project about 14 ha)*
Altitude:		*202 - 203 m a. s.*
Position:		*The territory is located in the Pardubice Region, in the cadastral areas of Břehy, Kladruby nad Labem, Labětín, Lohenice u Přelouče, Mělice, Přelouč, Řečany nad Labem, Selmice, Semín, Valy nad Labem.*
Ecotope:	*Gravel-sand alluvium on the Czech lower reaches of the Elbe, which are an exceptional type of habitat in the Czech Republic.*	
Quality and importance:	*Meadows near Přelouč are a locality important for the occurrence of two rare species of butterflies, the marsh blue and the vaccinated bluebird.*	
Vulnerability:	*not detected*	
Species - plants:	-	

Species - Animals:	*Marsh blue (Maculinea nausithous), blue-breasted blue (Maculinea teleius)*

Table No. 78: Characteristics of EVL Kladruby nad Labem

EVL Kladruby nad Labem	
Site Code:	*CZ 0533698*
Area:	*450,034 ha*
Altitude:	*200 - 210 m above sea level*
Position:	*The territory is located in the Pardubice Region, between the villages of Kladruby nad Labem and Selmice, on the right bank of the Elbe River, about 7 km NW of Přelouč and includes a substantial part of the National Stud Farm Kladruby nad Labem.*
Ecotope:	*Along the Elbe and in the eastern half of the EVL there are Holocene alluvial sediments (clay, sand, gravel) of fluvial genesis; in the northwestern part and at the northern edge prevails Upper Pleistocene windblown mostly quartz light fine-grained sand of aeolian origin; in the places of the current and former dead and blind branches of the Elbe River, in the middle of the southern part of the site there are organic, mostly dark brown Holocene sediments (fen, peat, rot); In the northwest corner of the site there are mineral-diverse Upper Pleistocene fluvial sediments (sand, gravel). The territory is part of the Czech Table, the East Bohemian Table, the East Elbe Table, the Pardubice Basin, the Kunětice Basin. SCI is mostly covered with modal fluvial deposits mainly from carbonate-free alluvial sediments, at the northern edge of the SCI there are cambisols arenic made of sands and gravel sands (terraces). Landscape characteristics: Landscape and biologically significant area including the stud farm area with pastures, meadows, draws, alleys of old hollow trees, numerous avenues of linden and poplars, groups of old trees in pastures and solitary oaks. The landscape character is complemented by overgrown blind river branches, pools, lakes, with remnants of original alluvial vegetation. The relief is more or less flat, typical for the middle course of the Elbe River, with numerous shapes of fluvial activity, especially in the southern part (more or less grounded blind and dead shoulders, shallow elongated depressions, low elevations, etc.). The EVL is followed by a forest complex from the north, the Elbe River forms the border in the south. In the west and east, SCI passes into a cultural landscape consisting mainly of fields and cultural meadows. EVL lies at an altitude of 203 - 208 m above sea level.*
Biota:	*EVL consists mainly of forest-free vegetation. Cultural meadows and pastures divide by paths that are lined with avenues of old trees predominate. Nature-friendly biotopes are concentrated in the southern part of the SCI on the banks of the Elbe, called Mošnice. Meadow biotopes of mesophilic oats (T1.1) and alluvial psárka meadows (T1.4) predominate here. Their communities are significantly influenced by agricultural management, mostly poorer stands with a predominance of grasses and common types of cultural meadows. Important species that can be found here include yellow (Thalictrum lucidum) and angular garlic (Allium angulosum). A significant landscape phenomenon of Mošnice are draws with remnants of hard alluvial plains (L2.3) with old penduncate oaks (Quercus robur), accompanied by other deciduous trees (e.g. lime (Tilia cordata), babyka maple (Acer campestre), ash (Fraxinus excelsior), common elm (Ulmus laevis), cherry (Prunus padus) etc. The herb layer has a distinct spring aspect, which is later replaced by nitrophilous vegetation, which is typical for this biotope. The quality of individual stands varies and is determined by forest management. In several places, the old Elbe branches were preserved in Mošnice in various stages of grounding. Mostly there is a habitat V1G (i.e. practically*

EVL Kladruby nad Labem	
	without vegetation), in one arm with the involved stand of yellow tuftwort (Nuphar lutea) it is the V1F biotope. The aquatic biotopes in the Elbe branches are further followed by wetland biotopes, especially monocenoses of common reed (Phragmites autralis, biotope M1.1) or high sedges (Carex sp. div., biotope M1.7). EVL has long been known as an important entomological locality. The most important is the long-term presence of stable populations of the protected xylophagous beetle species Cucujus cinnaberinus and Osmoderma eremita. Other species include the presence of the magnificent flower chafer (Cetonischema aeruginosa), the lime beetle (Lampra rutilans), the flower chafer Liocola lugubris, the beetles Ampedus nigroflavus and Lacon querceus, the armed beetle (Odontaeus armiger), the spine beetle Silis nitidula, the flowerworm Prionychus ater, the redhead Pyrochroa serraticornis, the potters Neatus picipes, Corticeus fasciatus, Diaclina fagi, the beetle Mycetophagus fulvicollis, the forester Laemophloeus monilis and the cornatus Gymnocharis oblonga. The territory is also very valuable in terms of vertebrate occurrence - 8 species of amphibians have been documented here (e.g.: crested newt (Triturus vulgaris), common toad (Bombina bombina), green frog (Hyla arborea), slender frog (Rana dalmatina), marsh frog (Rana ridibunda)), 4 species of reptiles, more than 80 species of birds (important e.g.: crested woodpecker (Upupa epops), stock dove (Columba oenas), wryneck (Jynx torquilla), grey flycatcher (Muscicapa striata), barn owl (Athene noctua), golden oriole (Oriolus oriolus), 5 species of bats (whistling bat (Pipistrellus pipistrellus), least bat (Pipistrellus pygmaeus), park bat (Pipistrellus nathusii), rusty bat (Nyctalus noctua), bat (Myotis myotis)). In total, there are more than 30 specially protected animal species in the territory.
Quality and importance:	*The whole area of EVL is of fundamental importance in terms of the occurrence of arboricolic fauna in the Elbe region. In the case of the Vermilion Woodpecker, there is one of the most numerous subpopulations in the eastern Elbe and Bohemia in general.*
Vulnerability:	*The threat to both species of xylophagous beetles is represented by the reconstruction of avenues and the destruction of aged trees, which may mean the destruction of the habitats of these species.*
Management:	*responsible authority - Regional Authority of the Pardubice Region* *Ensure the occurrence of individual dying and dead trees, leave standing and fallen dead trees with hollows, dry branches and xylophagous fungi. Where dendrological modifications are necessary for reasons of safety, apply methods friendly to fauna (lowering the center of gravity, roofing of cavities without chemical preservation).*
Potential conflicts of interest:	*Operation and maintenance of the national stud farm, especially the restoration of old avenues and alleys (landscape aspect) and ensuring the safety of horses and visitors.*
Species - plants:	*They are not subject to protection*
Species - Animals:	*Cinnamon woodpecker (Cucujus cinnaberinus) and brown stink beetle (Osmoderma eremita)*

Table No. 79: Characteristics of EVL Týnecká mokřiny

EVL Týnecké mokřiny	
Site Code:	*CZ 0213061*
Area:	*77,075 ha*
Altitude:	*200 - 204 m above sea level*
Position:	*The location is located on the border of the Pardubice and Central Bohemian regions. It is a pool on the right bank of the Elbe between the villages of Labské Chrčice and Kojice.*

Ecotope:	*From the geological point of view, the subsoil of the territory consists of Elbe gravel sands deposited on chalk (lower Turonian) marlstones. The territory lies on the border between the East Elbe Table and the tip of the Iron Mountains. It is a flat area with a number of terrain depressions (pools) with adjoining meadows. From the pedological point of view, alluvial loams, gleys and fillings of dead river branches are developed on gravel. On them are developed gley fluvises. Landscape characteristics: It lies in the tip of the eastern border of the Central Bohemian Region, in the wide Elbe floodplain affected by the gradual regulation of the Elbe River, sparsely forested, mostly intensively farmed, dominated by the nearby hill Šibeník.*
Biota:	*In the territory (PR Týnecké mokřiny) there is a mosaic of communities of standing waters (Nymphaeion alliance) consisting of floating, floating and submerged higher plants, reedbeds (Phragmition communis alliance, M1.1) and willow stands. The wetlands are followed by managed meadows with different groundwater levels with communities of high sedges of the Magnocaricion elatae alliance (M1.7), wet meadows of the Alopecurion alliance (T1.4) to Calthion (T1.5), alternately wet molinia meadows of the Molinion alliance (T1.9) to mesophilic oat meadows (T1.1). The territory is an important migration stop and nesting place for birds. The fauna of small birds bound to water and wetlands is particularly rich, e.g. the meadow flycatcher (Remiz pendulinus), four species of reed warbler (Acrocephalus scirpaceus), the singing warbler (A. palustris), the great warbler (A. arundinaceus) and the striped warbler (A. schoenobaenus)), the green warbler (Locustella naevia).*
Quality and importance:	*An important locality for the fire-bellied toad (Bombina bombina) in the Elbe region.*
Vulnerability:	*At risk of silt, eutrophication and excessive loading.*
Management:	*On fisheries-managed water areas to support the development of littorals. After the continuous overgrowth of some parts of the site by ploughman, it is possible to create small open water areas.*
Potential conflicts of interest:	*Unknown*
Species - plants:	*They are not subject to protection*
Species - Animals:	*Fire toad (Bombina bombina)*

6. Nature Parks

In order to protect a landscape character with significant concentrated aesthetic and natural values, which is not particularly protected under Part Three of Act No. 114/1992 Coll., on Nature and Landscape Protection, as amended, the nature and landscape conservation authority may establish a nature park (BC) by a generally binding legal regulation and set restrictions on such land use, which would mean destruction, damage or disturbance of this area.

Nature parks declared under par. (3) §12 of Act No. 114/1992 Coll. include primarily areas with natural and aesthetic values, while aesthetic values arise depending on the aesthetic attractiveness of the landscape. It applies such landscape attributes as harmonious scale and harmonious relationships in the landscape, expressiveness and distinguishability of visually perceived scenery and panoramas, or the specific character of settlements and buildings and its harmonious integration into the landscape framework.

There is no nature park in the Area of Interest or in its wide surroundings. The nearest natural parks are located at a distance of about 20 or more km from the project (e.g. PřP Heřmanův Městec, Doubrava, etc.).

7. Significant landscape features, memorable trees

According to § 3 para. 1 point. b) Act No. 114/1992 Coll., on Nature and Landscape Protection, as amended, an important landscape element (VKP) as an ecologically, geomorphologically or aesthetically valuable part of the landscape forms its typical appearance or contributes to maintaining its stability. Important landscape elements are forests, peat bogs, watercourses, ponds, lakes, floodplains. They also include other parts of the landscape which are registered by the nature conservation authority as an important landscape element pursuant to Section 6 of the same Act, in particular wetlands, steppe grasslands, draws, margins, permanent grasslands, mineral and fossil deposits, artificial and natural rock formations, outcrops and outcrops. They can also include valuable areas of vegetation of settlement formations, including historical gardens and parks.

Within the area of interest, the occurrence of registered VKP was not detected. According to the territorial analytical documents from 2016 for ORP Přelouč, there are no registered VKP in the wider surroundings of the Embassy. However, a study was prepared, and 24 sites were selected for the declaration of VKP. None of these sites are located in the municipality of Trnávka or Chvaletice

In the area in question there are no declared landscape elements, but only VKP by law. These include, in particular, the nearby Elbe River, which lies about 50 m at the eastern, northern and western border of the area of interest, including the alluvial plain. It can therefore be stated that the project lies in VKP (Elbe floodplain). Furthermore, smaller watercourses to the east of the project can be considered as other such VKPs.

In this text, tree stands in the area of interest are considered to be tree species growing outside the forest (see the relevant chapter below).

Memorial trees do not occur in the area of the project. The nearest listed trees are in an alley of oaks and elms on the border of the villages of Horka I and Horušice more than 6 km south of the area of interest.

8. Territory of historical, cultural or archaeological significance

Basic historical facts

Chvaletice

Chvaletice is a former mining town, located on the left bank of the Elbe River at an altitude of 210 – 310 m. Chvaletice appears in written reports for the first time in 1393, when the court with the fortress near the village was the property of Hereš of Chvaletice, and in 1407 Myslibor.

Originally, there were two villages in the area of today's Chvaletice, namely Chvaletice and Telčice. In the fifties of the twentieth century, a large open-cast pyrite quarry was opened east of the town, to which the northern part of the original Chvaletice fell victim. New houses were built for the affected population in the surrounding villages, especially in Telčice. The torso of the original Chvaletice was merged with Telčice and the new seat was named Chvaletice. The remaining development of the original Chvaletice was renamed to Hornická čtvrť and Telčice disappeared as the name of the village (it remained only as a designation of the cadastral area). After a long time, the street passing through the original old Telčice was named V Telčice, so that the old name of the village would not disappear completely. Today, Chvaletice is called the Hornická čtvrť, where there are buildings worthy of monument care, especially the Evangelical Pseudo-Renaissance Church from 1882. The promontory under the church is a lookout point providing a view of the Labe landscape. The entire church complex, the rectory and cemetery and the school in the Hornická čtvrť, realized according to the design by architect Řepa, deserve attention and a certain degree of protection. Chvaletice gained town status on 1 January 1981 (www.chvaletice.cz, 2022).

Trnávka

The first written mention of the village Trnávka dates back to the 14th century. Thanks to the proximity of the trade route and the abundance of fish and wicker, the area offered ideal living conditions. Although the oldest record in written sources dates back to 1333, it is clear that the settlement of the area began as early as the 10th century AD. The original name of the village was Tyrnov, later then Trnová and from the 2nd half of the 16th century stabilized on the current Trnávka. This name is probably related to the large number of thorn bushes in the area. After 1950, the Mangaboredo Plants were built. In 1960, Trnávka was connected to the neighboring village of Řečany nad Labem, but in 1993 it again became an independent village (www-Trnávka-obec.cz, 2022).

Heritage Protected Areas

According to Act No. 20/1987 Coll., on State Heritage Care, as amended, heritage protected areas are divided into several categories according to the degree of protection and character of the monuments. These are heritage reservations, heritage zones and heritage protection zones. These areas are declared by government decree or decrees of the relevant municipalities.

Directly in the area of the project there is a protective zone of the national cultural monument Stud Farm in Kladruby. The protection zone was declared within the Zoning Decision on the Protection Zone (ref. MUPČ 16571/2020) and came into force on 9.10.2020. The reason for defining this protective zone was to ensure proper protection of the National Heritage Site Stud Farm in Kladruby nad Labem in connection with the inscription of the National Heritage Site on the World Cultural and Natural Heritage List (UNESCO), as a Landscape for breeding and training ceremonial and carriage horses in Kladruby nad Labem. The aim of the protective zone is to preserve the landscape and panoramic values of the National Heritage Site and its visual links with adjacent areas.

In the protective zone, emphasis is placed on preserving visual and compositional relations to the urban and landscape values of the national cultural monument Stud Farm in Kladruby nad Labem, in particular:

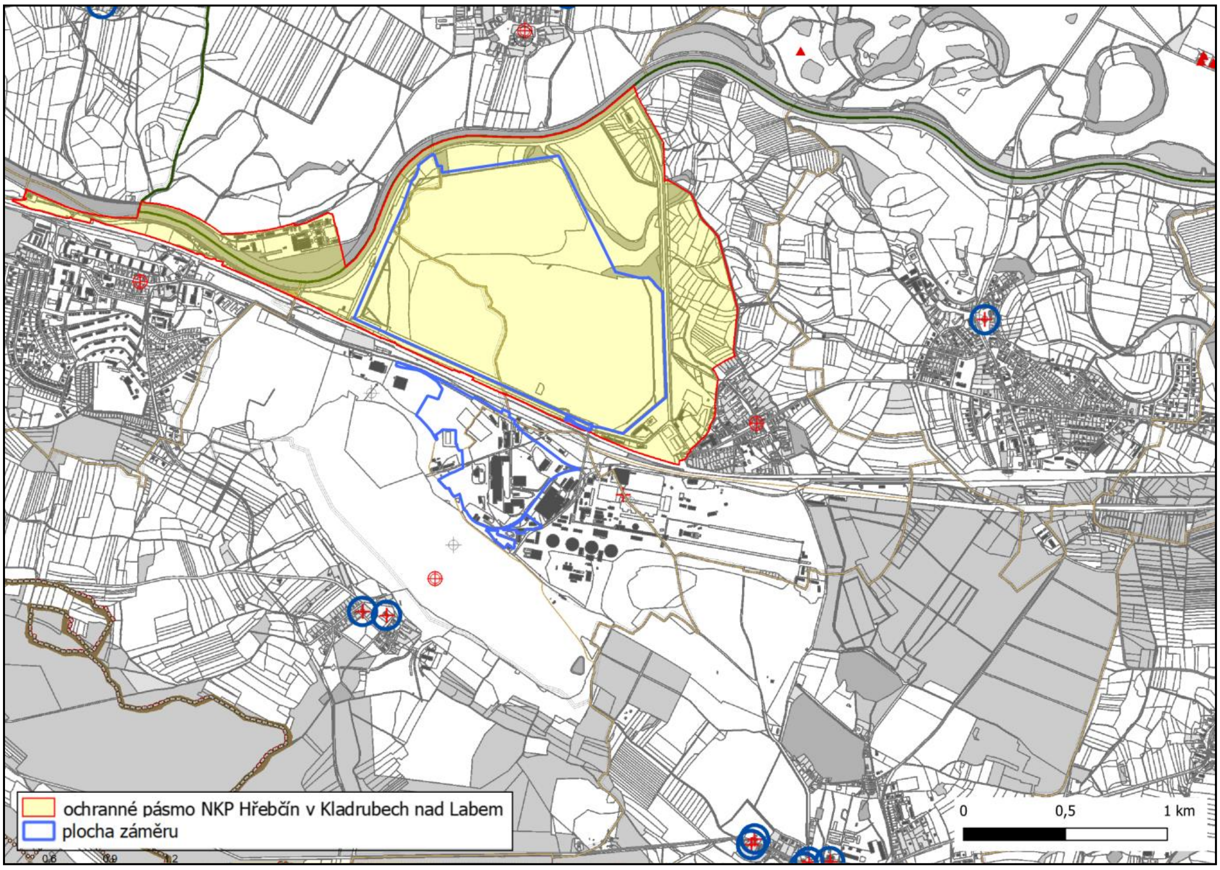
- preservation of the current silhouette and panorama,
- preservation of essential characteristic views and views of the National Cultural Heritage Site,
- preservation and regulation of the height of the surrounding buildings, which would limit the visual links to the National Cultural Heritage,
- maintaining suitable functions of use and for the rehabilitation of inappropriately used areas.

According to § 17 para. 1 of the Act on the Protection of Monuments, it is determined that for the following types of work in the protection zone is excluded the obligation to request a prior binding opinion pursuant to § 14 para. 2 of the Heritage Act:

- all buildings, landscaping and installations the overall height of which is less than 10 m and their highest point does not exceed 229 metres above sea level;
- all buildings, landscaping and installations with a ground plan area of less than 300 m^2.

In all other cases, it is necessary to submit an application to the competent authority of state heritage care for the issuance of a binding statement pursuant to § 14 par. 2 of the Heritage Act.

Picture no. 59: Localization of the project and the protective zone of the Hřebčín National Park in Kladruby nad Labem



Heritage zones and reserves are not located directly in the area of interest. The closest such locality is the landscape conservation area of the Kladruby Polabí, whose border is located approximately 70 m from the northern border of the project on the opposite bank of the Elbe River. The nearest urban conservation area is Týnec nad Labem, which is located about 5 km west of the project.

More detailed information on the cultural monuments themselves can be found in Chapter C.2.8.

Areas with archaeological finds and important archaeological sites

An area with archaeological finds is considered to be an area where it is reasonable to assume the occurrence of archaeological finds, or where archaeological finds or archaeological sites have already occurred. The archaeological heritage occurs almost throughout the Czech Republic, with the exception of areas excavated in the past on the pre-Quaternary bedrock.

If construction activities are to be carried out on the territory with archaeological finds, the builders are obliged to notify the Institute of Archaeology of this intention from the time of preparation of the construction and to allow it or an authorized organization to carry out rescue archaeological research in the affected area. A similar procedure applies if other activities are to be carried out in such an area that could endanger the implementation of archaeological research.

The State Archaeological List (SAS) application of the Czech Republic in the information system of the National Heritage Institute (IS NPÚ) enables searching and printing of basic data on the territory with archaeological finds (UAN). The following information can be obtained within this application:

SAS serial number - unique UAN identifier, which is composed of map sheet number ZM 1:10000 and UAN number on the respective map sheet; both numbers are separated by a slash (eg. 34-21-15/1). The SAS sequence number is assigned by the author of the UAN identification.

Name UAN - the name is assigned by the author of the UAN identification.

Category UAN:

I. - territory with positively proven and further safely assumed occurrence of archaeological finds.

II. - an area where the occurrence of archaeological finds has not yet been positively proven, but certain indications indicate it, or it has been proven so far only unreliably; Probability of occurrence of archaeological finds 51 - 100%.

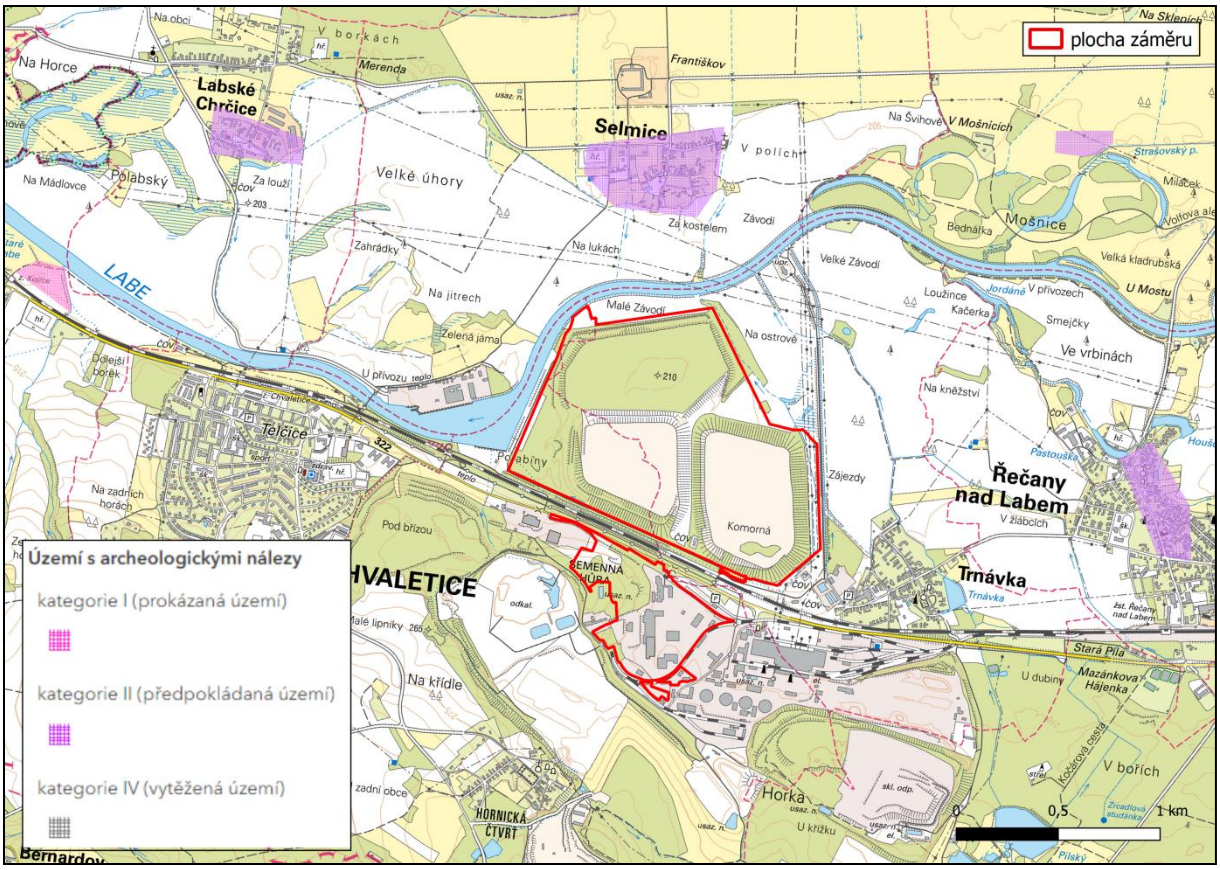
III. - an area in which the occurrence of archaeological finds has not yet been recognized and positively proven, and there are no indications of this, but since the area in question may have been inhabited or otherwise used by humans, there is a 50% probability of archaeological finds (all other/remaining territory of the state except category IV). UAN III is not registered in SAS CR.

IV. - an area where there is no realistic probability of occurrence of archaeological finds (all areas where layers and deposits above the pre-Quaternary geological bedrock were excavated).

Regional administrator - an organization authorized to carry out archaeological research, which carries out maintenance, revision and updating of information of the SAS CR in the given area. The regional administrator uses the data of the SAS CR to protect and save archaeological finds (immovable and movable) and areas with archaeological finds and enables the provision of data in the specified scope and regime to interested parties, especially employees of state administration bodies and builders.

Cadastre and District - UAN jurisdiction to territorial units.

Picture no. 60: Sites of archaeological finds in the vicinity of the project area



From the very principle that the deposits were formed anthropogenically in historically recent times, archaeologically valuable artifacts cannot be found in their bodies. However, it is not known whether there is an archaeological site under the deposits or whether archaeological research was carried out in this area in the past.

According to the NPÚ IS, there is only one category I locality in the vicinity of the area of interest. It is a locality called Kojice site 1, which is located about 2.4 km west of the project area. In the urban areas of nearby settlements (but outside Trnávka and Chvaletice) there are localities of category II. These are the localities Labské Chrčice obec, Selmice obec, Kladruby nad Labem za Strží and Řečany nad Labem obec.

The NPÚ IS contains a database of so-called NPÚ. Important archaeological sites (VAL). The purpose of the database is to select individual areas with archaeological finds registered in the SAS CR, which are among the most valuable sites with a high degree of preservation of archaeological terrains and immovable and movable archaeological finds. According to the map server of the NPÚ IS, there is no registered VAL locality in the cadastral area of Chvaletice or in the cadastral area of Trnávka. The nearest such hay site is located in the cadastral area of Kojice about 3.5 km west on the northwestern outskirts of the village Kojice. It is a ruin of a fortress from the 14th century.

Burial grounds, reverent places - objects, war graves

According to Act No. 256/2001 Coll., on funeral services, a protective zone of at least 100 m is established around public burial grounds. The Building Authority may prohibit or restrict the implementation of buildings, their changes or activities in this protection zone that would endanger the operation of a public burial ground or could endanger the proper operation of a public burial ground or its dignity. A cemetery located in the open countryside can also be subject to legal protection under Act No. 114/1992 Coll., on Nature and Landscape Protection, as a so-called significant landscape element (VKP).

A place of reverence is a memorial plaque, monument, memorial or similar symbol that commemorates war events and victims. A war grave is a place where the remains of persons who died as a result of active participation in a military operation (e.g. a member of the Czechoslovak Army, a member of the Czech Army, a soldier who served in the allied army, a member of a border guard guard) or as a result of war captivity (prisoner of war) or the remains of persons who died as a result of participation in the resistance or a military operation during the war (e.g. they were executed for participation) are buried; a registered place with unclaimed remains of persons who died in connection with the war event; another object that is considered a war grave in accordance with an international treaty binding the Czech Republic.

According to the WMS services of CENIA War Graves and Cemeteries and Burial Grounds, there is no cemetery or war grave on the project area. The nearest cemetery is located about 550 m south-east and is located in the village Trnávka. In the village of Trnávka there are also two of the nearest war graves about 600 m southeast of the project area.

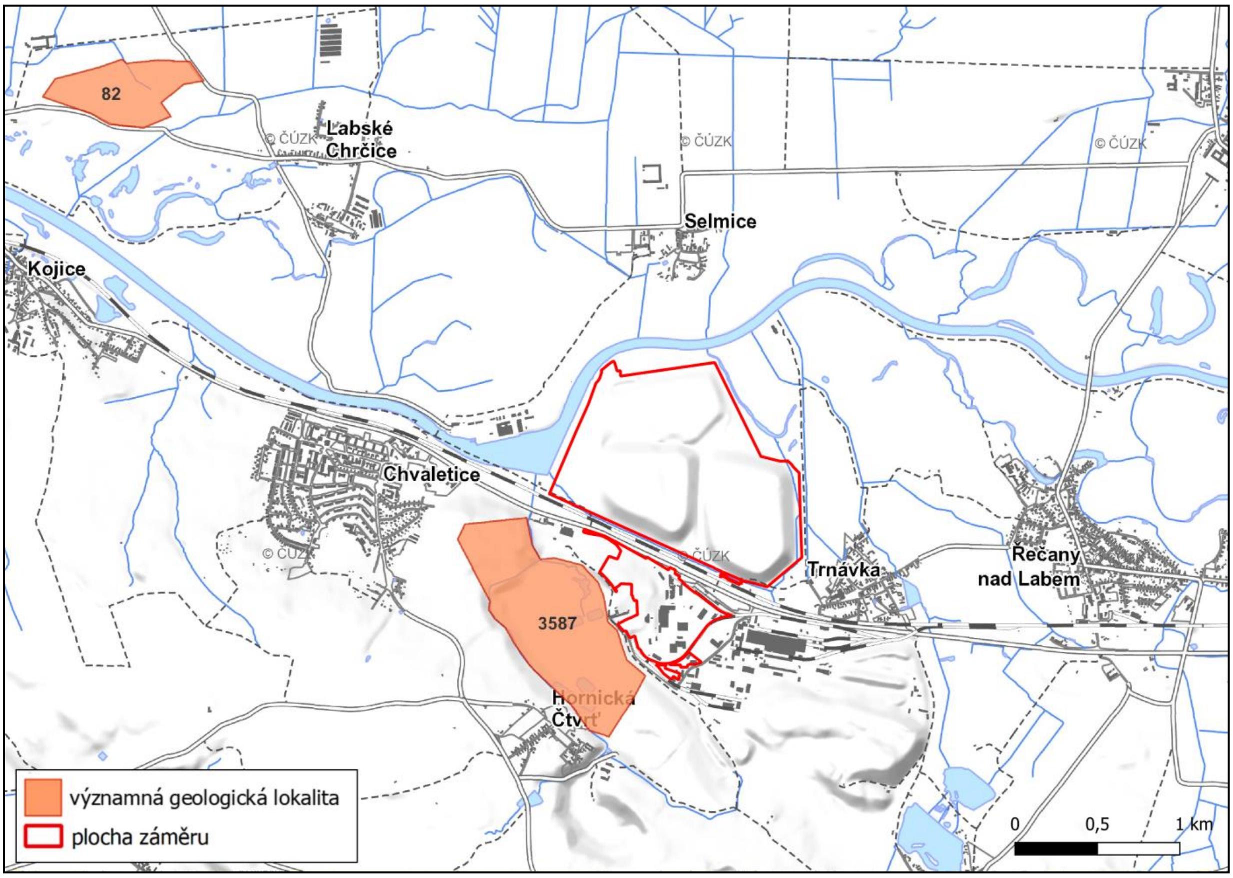
Picture no. 61: Localization of the project according to the maps Cemeteries and Burial Grounds and War Graves (CENIA)

Important geological localities

The importance of geological heritage sites is given by the evidence of geological development, the presence of evidence of life forms and environmental conditions in the past, documentation of tectonic and metamorphic development, dynamics of the development of the Earth's surface, occurrence of minerals, geomorphology, etc. Within the project Significant Geological Localities of the Czech Republic of the Czech Geological Survey, a comprehensive system of registration of significant geological localities (VGL) was created. The database contains records of sites protected, proposed for protection and a number of other scientifically valuable, aesthetically or otherwise interesting or unique localities of predominantly geological, mineralogical or paleontological character.

According to the MS CGS, no significant geological localities are registered in the area of interest. The nearest such locality is the area VGL called Chvaletice (site ID: 3587), which lies about 350 m SW of the ZÚ. It is a former area of surface mining of the Chvaletice deposit and several rock outcrops. After the cessation of ore mining, the opencast quarry was used as a repository for fly ash from the Chvaletice power plant and is currently filled with fly ash. The site is an important mineralogical site of European importance, there were carbonates and silicates of manganese and iron (rhodochrosite and rhodonite) and iron sulfides (pyrite), and other, often rare minerals (pyroxmangite, helvín, etc.). Another important geological locality in the vicinity of the project is the area VGL called Duny u Svárava (site ID: 82), located about 3 km NW of the project area. It is a sand dune formed during the late glacial period (13,000 – 11,000 BC) by the removal of material from fluvial sediments (Elbe terraces).

Picture no. 62: Localization of the project according to the VGL map (CGS, 2022)



9. *Densely populated areas*

The area of interest lies on the territory of the municipalities of Trnávka and Chvaletice, the neighbouring municipalities are Kladruby nad Labem, Kojice, Selmice, Řečany nad Labem and Zdechovice.

Table No. 61: Population density (as of 1 January 2022 according to the CZSO)

Municipality	Population	Area of the municipality (ha)	Population density (inhabitants/km^2)
Chvaletice	2 910	850	342,4
Trnávka	208	363	57,3
Kladruby nad Labem	606	2 381	25,5
Kojice	425	612	69,4
Selmice	132	542	24,4
Recany nad Labem	1 383	552	250,5
Zdechovice	638	862	74,0
Total	***6 302***	***6 162***	***120,5***

The administrative territory of the town of Chvaletice can be considered to be relatively densely populated (342.4 inhabitants/km2), but in comparison, for example, with Pardubice (1,070.9 inhabitants/km2), the population density is one-third. The vicinity of several municipalities can be considered as areas with normal to lower population density (the exceptions are the municipalities of Chvaletice and Řečany nad Labem), the average population density is 120.5 inhabitants/km2, which is less than the national average (133 inhabitants/km2), but higher than the average of the Pardubice Region (114 inhabitants/km2).

10. Areas loaded in excess of the load capacity

One of the main principles of environmental protection is the principle that the territory must not be burdened by human activities beyond the level of bearable load, while according to Section 12 of Act No. 17/1992 Coll. "the permissible level of environmental pollution is determined by limit values set by special regulations". A special regulation is, among other things, Government Regulation No. 272/2011 Coll., on health protection against the adverse effects of noise and vibration, which sets hygienic limits for noise and vibration, and Act No. 201/2012 Coll., on Air Protection, which sets immission limits.

Air

Based on the air pollution map, or on the basis of the results of immission measurements in the Czech Republic, reliable compliance with the valid immission limits for average annual and short-term maximum concentrations of all emitted pollutants, i.e. NO_2, PM10, PM2.5, benzene and benzo(a)pyrene, can be expected in the solved locality.

From the air point of view, the immission limits are safely met, including benzoapyrene, for which a slight excess in one mapping square of 1 x 1 km in the territory of Chvaletice was indicated at the time of processing the notification of intent. The improvement of the situation corresponds to the generally positive development in the Czech Republic in recent years.

Noise

The noise study evaluates the current noise pollution in the area from traffic and from existing stationary sources. Details of the acoustic situation were determined by our own measurements, calculations and data on existing noise sources.(Králíček, 2023)

The data show that the hygienic noise limits are exceeded in the area. The reason for the exceedance is the existing closed industrial areas in the vicinity of the project, especially the operation of the Chvaletice Power Plant (ECH), as a result of which the hygienic noise limits are exhausted and exceeded, especially in the area. Another important stationary source of noise is the quarry southeast of the village of Hornická čtvrť (operated by GRANITA s.r.o.) and the foundry KASI Chvaletice.

On the basis of the approval of the KHS of the Pardubice Region dated 25.11.2022, Ref. No. KHSPA 21898/2022/HOK-Pce on the amendment of the integrated permit for the facility "Combustion plant with a rated thermal input of more than 50 MW" (ECH Chvaletice) on the integrated permit, the operation of a noise source that does not meet the hygienic noise limit at night due to the Trnávka reference control point was permitted. According to this opinion, it is necessary to implement anti-noise measures in the ECH area within the scope of stage 4 – implementation by 31.12.2023, optimization of measures by 30.6.2025. After the implementation of complete anti-noise measures of the entire 4th stage, the equivalent sound pressure level A $L_{Aeq,1h}$ = 43.5 dB for the noisiest hour at night in the period until 30.6.2035 will not be exceeded at the nearest protected outdoor areas of buildings in the village of Trnávka at night – on the top floor of house No. 91 in the village of Trnávka. However, according to the discussion with the KHS of the Pardubice Region, the computational model of noise from sources in the ECH area was set up so that the noise from the existing sources, including the ECH, meets the hyg. limit $L_{Aeq,1h}$ = 40 dB for the night in Trnávka, which would prove that after taking into account the noise sources of the assessed project project, the value of 40 dB will not increase by 0.1 dB for the entire duration of the project.

If the project does not worsen the situation even at a background noise level of 40 dB, then it is obvious that it will not worsen it even at a higher noise level than the desired limit value from other sources is reached. Based on the above, an up-to-date acoustic assessment was performed (see Chapter D.I.3).

As far as noise from the railway and public roads is concerned, the noise study states that the hygienic noise limits are mostly adhered to, with the exception of 1 building in Zdechovice, details are given in the noise study.

It can therefore be stated that in some specific areas it is an area burdened beyond the level of tolerable load. Therefore, the conditions for the implementation of the project were formulated and designed in such a way that the project would not worsen this burden in any way.

Effects of mining activities

According to the map server of the Czech Geological Survey, the area of the undermined area of Chvaletice 2 extends into the processing plant area (ID: 2873). It is a stabilized area that does not pose a risk to the project In the past, pyrite was mined in this area. Within the wider surroundings there are other undermined areas, an overview of which is given in the following table.

There are five mine workings in the vicinity of the project. All of them are located in the undermined area of Chvaletice 1 – Bernardov. These are two shafts, two chimneys and a mine, which were created for exploration purposes of potential extraction of radioactive raw materials.

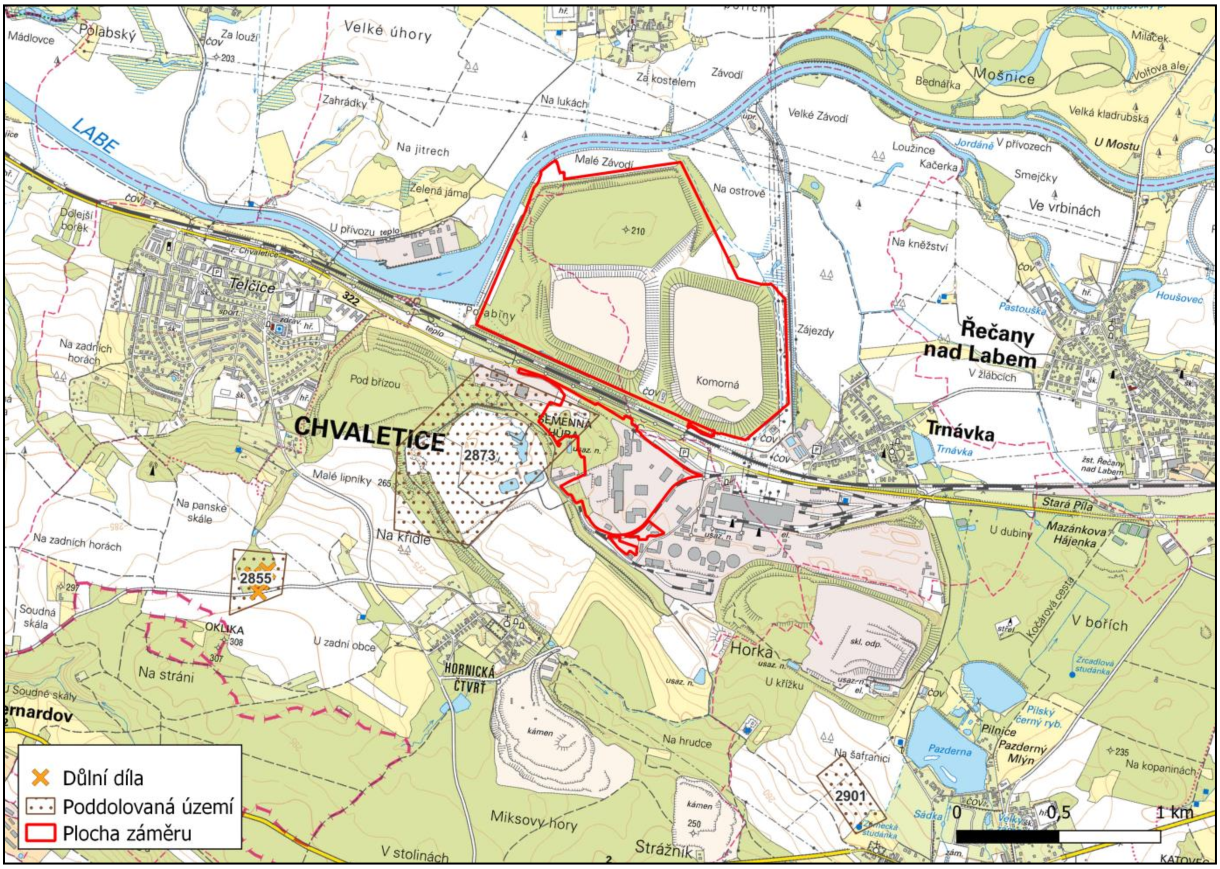
Table No. 62: Undermined areas in the vicinity of the project area (www.geology.cz, 2022)

Undermined areas					
ID	**Title**	**Raw material**	**Age**	**Manifestations of mining activity**	**Extent of undermining**
2855	Chvaletice 1 - Bernardov	Radioactive raw materials	after 1945	dumps	Corridor system
2873	Chvaletice 2	Pyrite	before and after 1945	dumps	Corridor system
2901	Zdechovice 2	Pyrite	after 1945	-	unique corridor

Table No. 632: Mine workings in the vicinity of the project (www.geology.cz, 2022)

Mine workings					
ID	**Title**	**Raw material**	**Type of work**	**Depth / Length (mouth) [m]**	**Closure**
5630	Shurf No. 50	Radioactive raw materials	shaft	39	1945
5632	B1 – 011	Radioactive raw materials	mining	50	1945
5629	Shurf No. 53	Radioactive raw materials	shaft	142,9	1945
5631	B1 – 0/P-12	Radioactive raw materials	chimney	34	1945
31841	B1-0/P-11	Radioactive raw materials	chimney	33	1945

Picture no. 63: Localization of undermined areas and old mine workings with respect to the area of the project



Other

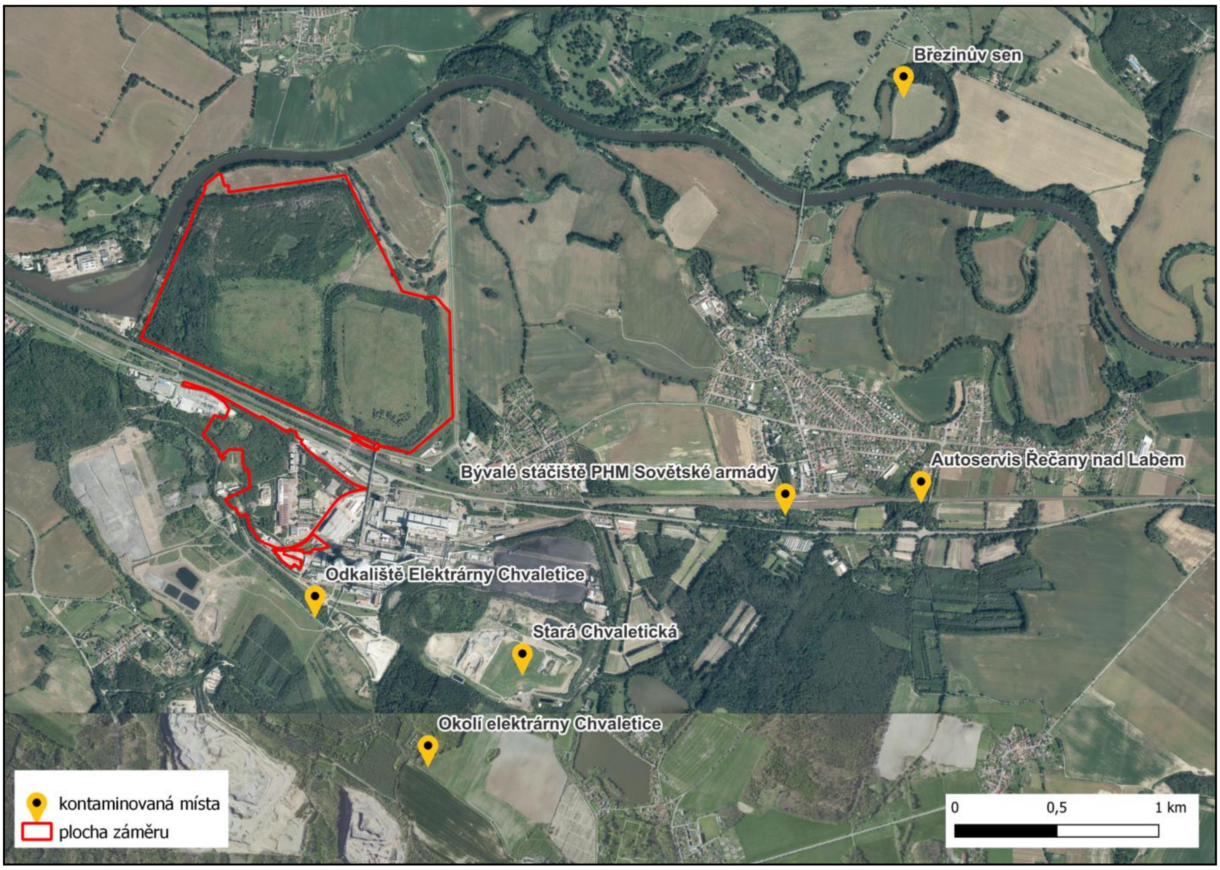
Groundwater samples from tailings and their immediate surroundings show a significant increase in the concentrations of some parameters, especially manganese (concentration of Mn in the order of tens to the first hundreds of mg/l, max. 658 mg/l), sulphates (concentration of SO_4^{2-} in the order of the first units g/l, max. 9 200 mg/l), iron (Fe concentration in the order of tens to the first hundreds of mg/l, max. 979 mg/l), aluminium (concentration of Al in the order of tenths to the first units of mg/l, max. 22.9 mg/l). Other monitored parameters also show a smaller or larger increase in comparison with, for example, hygienic limits for drinking water, but they do not reach such values as the above parameters. Increased concentrations of monitored parameters are directly related to the deposited material at the tailings. Details are given in Chapter C.2.2 and in the hydrogeological study and its annexes. However, it can be stated that groundwater is overburdened in certain aspects.

11. Old environmental burdens and contaminated sites

An old environmental burden is a serious contamination of the rock environment, groundwater or surface water, which occurred due to improper handling of hazardous substances in the past (especially oils, pesticides, PCBs, chlorinated and aromatic hydrocarbons, heavy metals, etc.). An identified contamination can only be considered an old environmental burden if the source of the contamination does not exist or is unknown. Contaminated sites can be of a diverse nature – they can be waste dumps, industrial and agricultural sites, small businesses, unsecured warehouses of hazardous substances, former military bases or areas affected by mineral extraction.

According to the system of registration of contaminated sites (SEKM), the nearest registered old environmental burden is a site called "Tailings of the Chvaletice Power Plant", located about 100 m S of the proposed project boundary. Contamination on the site is confirmed, it does not represent a current health risk or conflict with legislation, but the possibility of further spread of contamination or negative influence on the current use of the landscape is not excluded. The second closest old environmental burden is the locality "Stará Chvaletická" about 1000 m SE of the project. Here, the current contamination would create an unacceptable health risk if the functional use of the site or the affected surroundings is changed to a more sensitive one compared to the current use. The third closest locality is, according to the SEKM system, "Surroundings of the Chvaletice Power Plant" about 1200 m SE of the project. It is a terminated opencast mine with suspected contamination. The site must be regarded as suspicious, and the need to implement a remedial measure cannot yet be ruled out.

Picture no. 64: Localization of the project according to the map of contaminated sites (SEKM, 2022)



The area of interest itself is not registered in the SEKM, although contamination has been detected there (see the parts dedicated to water).

12. Extreme conditions in the area concerned

In terms of natural factors, there are no extreme conditions in the territory. From the point of view of human activities, the area was relatively burdened in the past and a certain burden persists to this day, although the consequences of former open-cast mining have been practically smoothed out. Although several operations with an impact on the environment (power plant, asphalt plant, open-cast quarry) accumulate in a relatively small area, the conditions in the territory cannot be considered extreme.

II. CHARACTERISTICS OF THE CURRENT STATE OF THE ENVIRONMENT OR LANDSCAPE IN THE AFFECTED AREA AND DESCRIPTION OF ITS COMPONENTS OR CHARACTERISTICS THAT MAY BE AFFECTED BY THE PROJECT

For the sake of completeness, the following characteristics of the state of the environmental components also describe environmental components that will not be significantly affected by the project.

1. *Air and climate*

Climatic characteristics

The area of interest belongs to the warm climatic area T2. This unit is characterized by a long, very hot and dry summer and a short, moderately warm, to very dry winter. The duration of the snow cover is short. Transitional period short with both warm spring and autumn.(Quitt, 1973)

Table No. 83: Characteristics of the climatic region T2

Characteristic	Value (temperature in °C, precipitation in mm)
Number of summer days	50 - 60
Number of days with average temperature above 10 °C	160 - 170
Number of frost days	100 - 110
Number of ice days	30 - 40
Average temperature in January	- 2 - -3
Average temperature in July	18 - 19
Average temperature in April	8 - 9
Average temperature in October	7 - 9
Average number of days with precipitation of 1 mm and more	90 - 100
Precipitation in the growing season	350 - 400
Precipitation in winter	200 - 300
Number of days with snow cover	40 - 50
Number of cloudy days	120 - 140
Number of days clear	40 - 50

Climatic data according to the Atlas of the Climate of the Czech Republic (average for the period 1961 - 2000):

- average annual air temperature: 8 - 9 °C
- average air temperature - spring: 8 - 9 °C
- Average air temperature - autumn: 8 - 9 °C
- Average air temperature - summer: 15 - 16 °C
- average air temperature - winter: -1 - 0 °C
- Average annual rainfall: 600 - 650 mm
- annual average total of comparator evapotranspiration: 650 - 700 mm
- Average seasonal number of days with snowfall: < 50 days
- Average seasonal number of days with snow cover: 30 - 40 days
- average of seasonal snow depth maximums: < 15 cm
- average annual duration of sunshine: 1 600 - 1 700 hours

- average annual wind speed: 2,0 – 3,0 m.s^{-1}

The wind rose for the site in question was taken from CHMI data. The wind rose is divided into 120 wind directions (3 degrees each). The designation of the wind direction is done clockwise, with 0 degrees being north wind, 90 degrees east wind, 180 degrees south wind, 270 degrees west wind. Calm is budgeted into the first class of wind speed. The geographical indication of the wind direction indicates where the wind is blowing from (the north wind blows from the north, the south from the south, etc.).

Picture no. 65: Wind rose for the locality (CHMI)

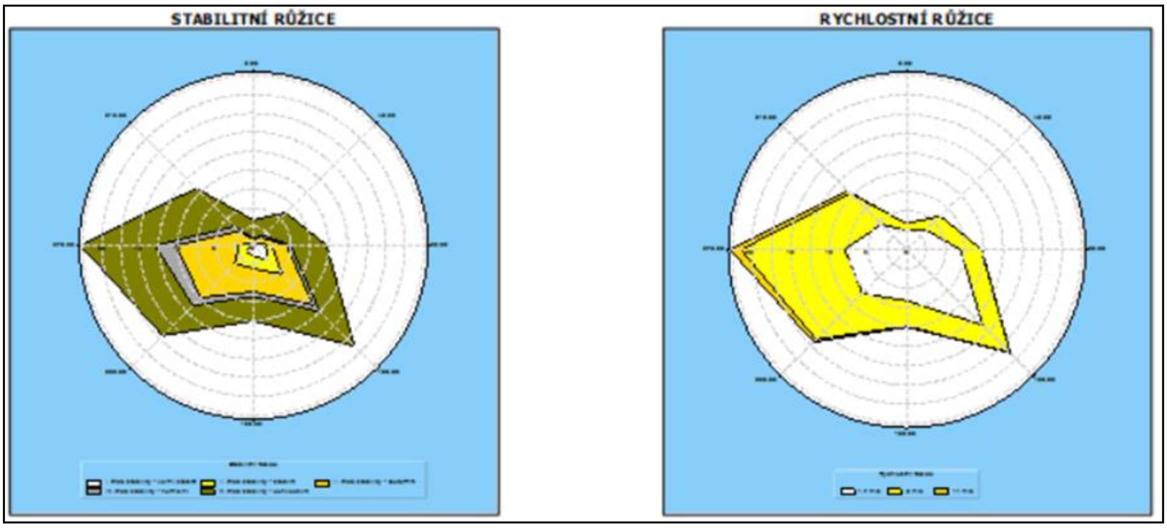


Table No. 84: Total (total) wind rose for the locality of interest (CHMI)

Total wind rose										
m/s	0	45	90	135	180	225	270	315	Calm	sum
1.7	2,42	3,55	6,95	7.20	13,86	6,65	8,05	7,99	4,61	55,51
5	0,93	2,56	2,72	5,01	3,27	8,42	13,38	5,69	0,00	41,98
11	0,01	0,00	0,01	0,08	0,11	0,47	1,44	0,39	0,00	2,51
sum	3,36	6,11	9,68	18,95	10,03	16,94	22,81	10,69	1,43	100,00

Impacts and vulnerability of territories to climate change

According to Article 1 of the United Nations Framework Convention on Climate Change, climate change is defined as climate change that is linked directly or indirectly to human activities that change the composition of the global atmosphere and that, in addition to natural climate variability, is observed over a comparable period of time. An alternative definition according to the Intergovernmental Panel on Climate Change (IPPC) is: Any climate change over time, whether related to natural variability or as a result of human activity.

<u>Climatic specifics and extremes of the area of interest</u>

When characterizing climate change in the area of interest, it is possible to take as a basis, for example, the current occurrence and frequency of climatic and weather extremes and natural disasters. From the available data, extreme natural disasters are not known in the locality. The Elbe River could encroach on the site with its floodplain, but according to the Q 5 and Q 100 Floodplains services, only the edge of the tailings is in direct contact with the floodplains for five-year and hundred-year flows. Due to their elevated morphology, the actual areas of the tailings do not reach the floodplains.

According to the publication Atlas of the Climate of the Czech Republic in maps of averages, annual maxima and minima of air temperature, the locality Trnávka falls between the higher range of maxima (33 – 34) °C and the lower mean range of minima (-19 to -18 °C). In terms of the annual total hours of sunshine, the area of interest falls into an area with a higher value from 1600 to 1700 hours / year. In the maps of the average number of tropical days and nights, the locality Trnávka falls among the higher mean ranges (number of days about 7 – 10, number of nights from 0.1 to 0.5).

The average annual rainfall ranks the locality among the middle-mentioned ranges (about 650 – 700 mm). From the point of view of the danger of precipitation and the occurrence of extreme precipitation (torrential rainfall with large totals – hourly, daily), it is not a dangerous or extreme location.

According to the above information, the area of interest in the Czech Republic can be characterized as a moderately exposed area with rather average climatic characteristics.

Climate change scenario and climate extremes

According to the project VaV SP/1a6/108/07, it is assumed that in the period between 2010 and 2039 the average air temperature will increase by 1.1 °C, while in summer and winter we can expect only a slightly smaller increase than in spring and autumn. In the following period between 2040 and 2069, there should be a more significant warming. The most significant increase in air temperature occurs in summer (by 2.7 °C) and least in winter (by 1.8 °C). It is worth mentioning the increase in temperatures in August by almost 3.9 °C. For the period 2040–2069, precipitation in winter (e.g. Krkonoše, Českomoravská Vysočina, Beskydy by up to 20%) and an increase in autumn are also expected. In summer, the Czech Republic begins to be dominated by a decrease in precipitation, which is even more pronounced in the period 2070–2099, while the decrease in winter precipitation is smaller compared to the previous period. The duration of the project falls within the second evaluation period.

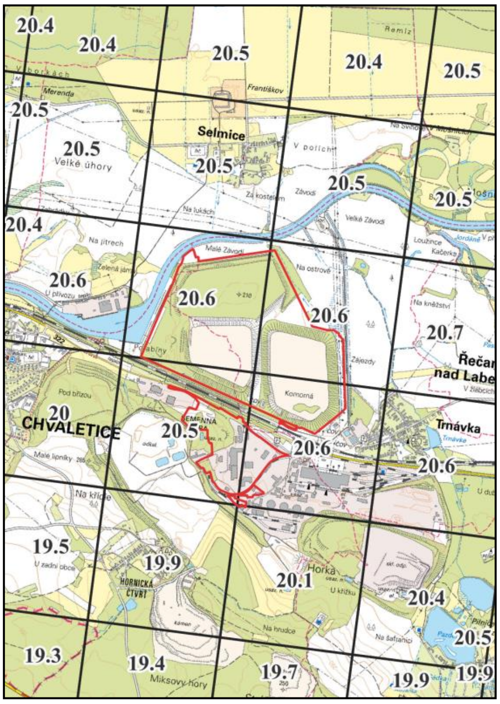
In terms of the anticipated consequences of climate change, it is not a significantly vulnerable territory. Even the threat of drought here is not very likely due to the location and location near the Elbe.

Air quality

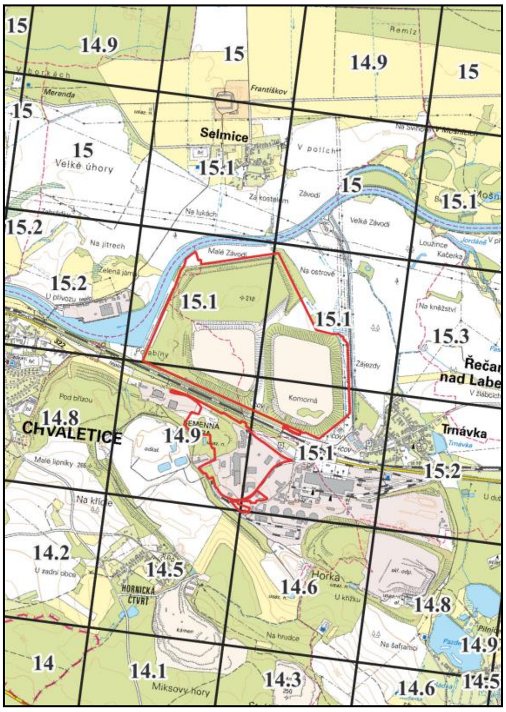
According to Act No. 201/2012 Coll., on Air Protection, the average concentration values for a square of 1 km 2 of the territory for the previous 5 calendar years are used to assess whether any of the immission limits are exceeded. These values are published annually by the Ministry of the Environment through the Czech Hydrometeorological Institute on the website. The map data contain in each square the value of the moving average concentration for the previous 5 calendar years for those pollutants that have an annual immission limit. Of the short-term immissions, the 36th highest daily immission PM_{10} and the 4th highest daily immission SO_2 are also evaluated.

The representation of representative squares from the air pollution map, in the territory of which the assessed traffic and the nearest residential area are located, together with the immission concentrations of the assessed pollutants, is shown in the following pictures:

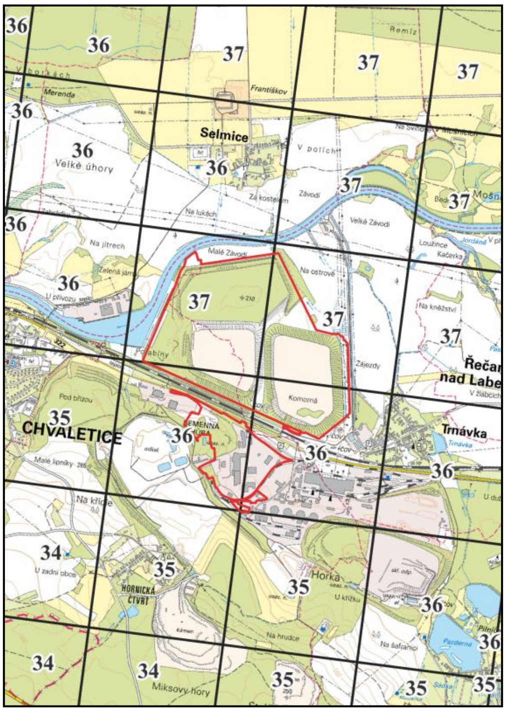
Picture no. 66: Average annual PM concentration$_{10}$



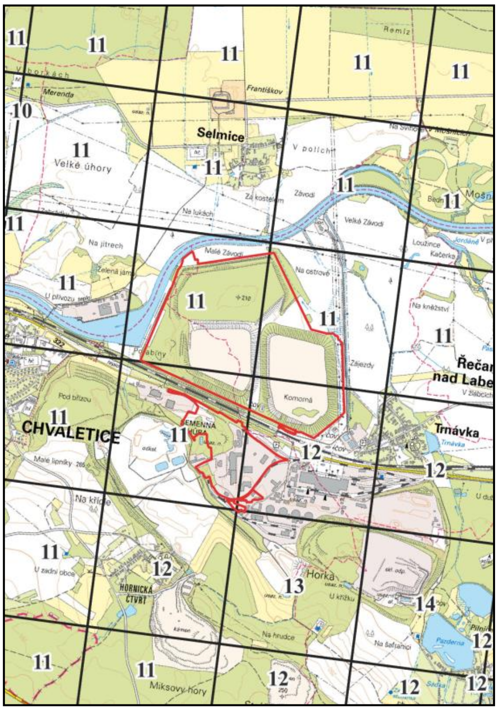
Picture no. 67: Average annual PM concentration$_{2,5}$



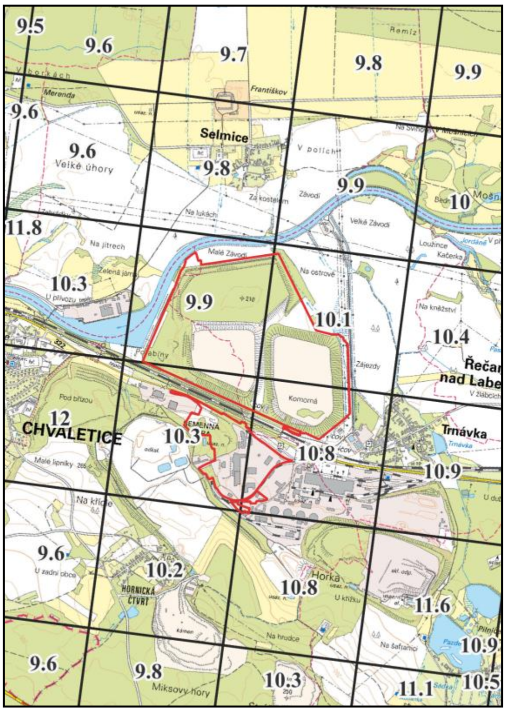
Picture no. 68: 36. Maximum max. daily PM concentration$_{10}$



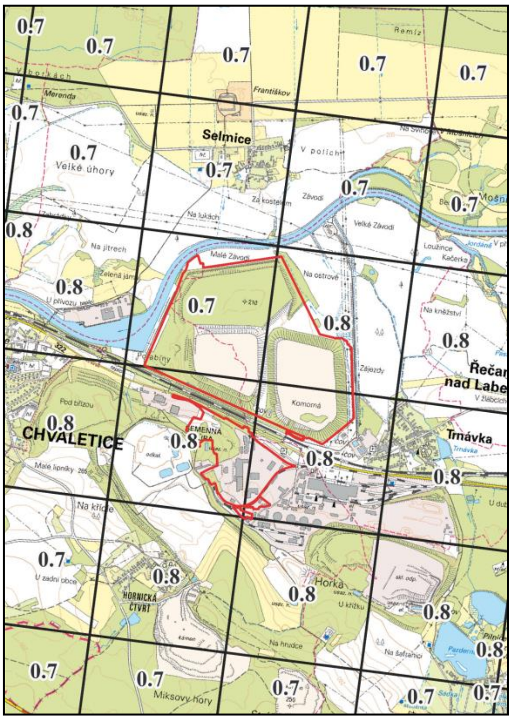
Picture no. 69: 4. maximum maximum daily concentration of SO$_2$



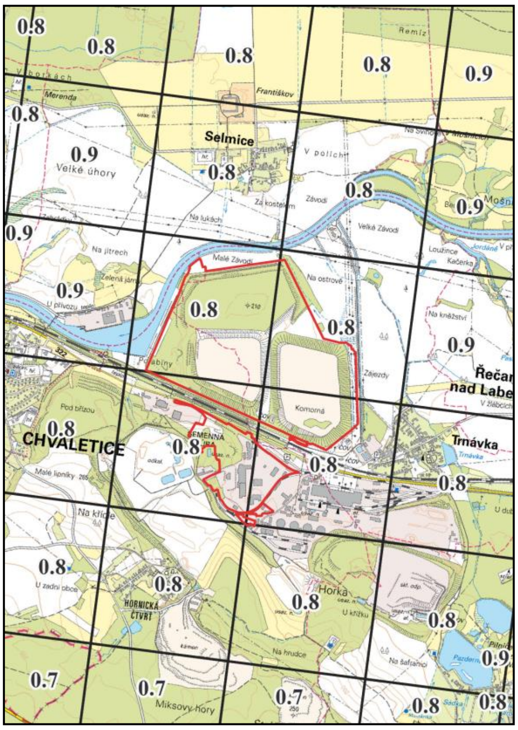
Picture no. 70: Average annual concentrations NO2



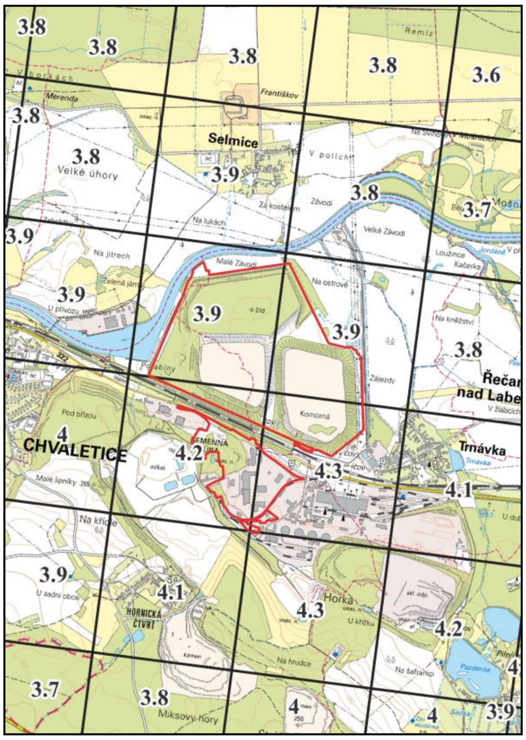
Picture no. 71: Average annual benzene concentration (µg/m^3)



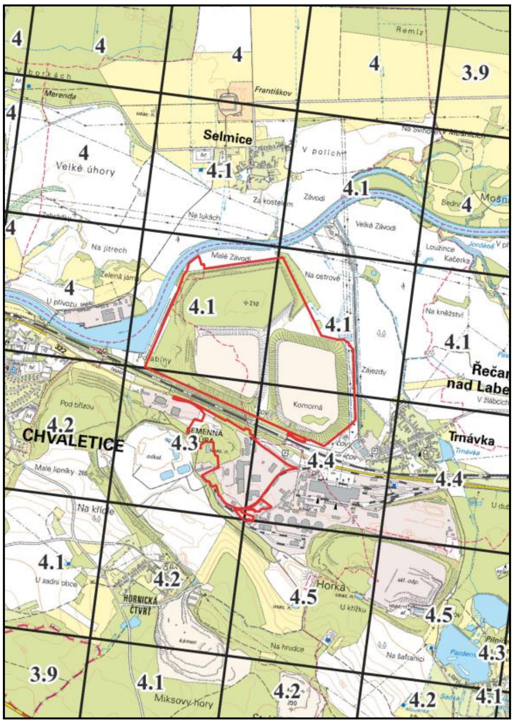
Picture no. 72: Average annual concentration of benzo(a)pyrene (ng/m)^3)



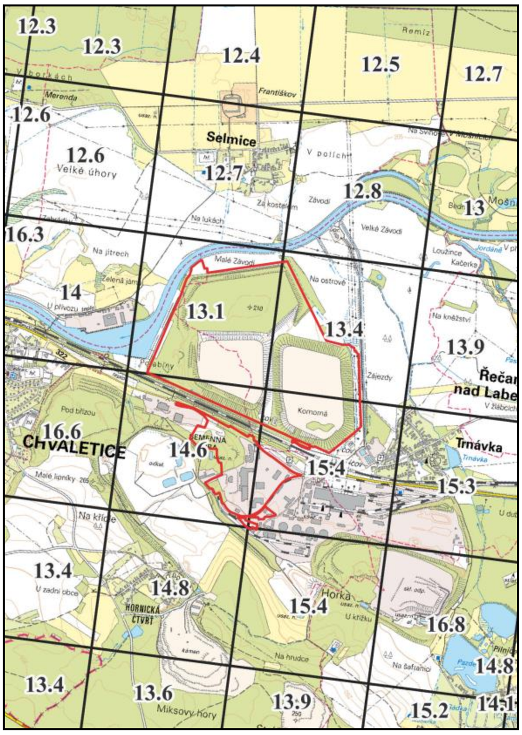
Picture no. 73: Average annual concentration of SO_2 (µg/m3)



Picture no. 74: Winter average SO concentrations$_2$ (µg/m3)



Picture no. 75: Average annual NO concentration$_x$ (µg/m3)



Source: Five-year average concentrations 2017 – 2021 (www.chmu.cz, 2022)

The dispersion study (Zambojová, 2022) contains a description of the existing immission background in the locality of interest. Only pollutants for which air pollution has been calculated are listed. The data on the immission background are based on data published on the CHMI website. These are the average values of immission concentrations for squares of 1 km^2 for the previous 5 calendar years (2017-2021).

The dispersion study contains a section from the map of squares showing the concentrations of individual pollutants in each square. These pollutants are benzene, benzo(a)pyrene, PM10, PM2.5, SO2 and NO2. Within the CHMI air pollution maps, hourly maxima of sulphur dioxide and nitrogen dioxide are not addressed. The map also does not include immission concentrations of other pollutants whose emissions are expected, such as ammonia and sulfuric acid. Furthermore, it is also possible to use the results of immission measurements at ISKO (Air Quality Information System – CHMI) to evaluate the immission concentrations of these pollutants.

Maximum hourly immission concentrations *of sulphur dioxide* was monitored at 60 immission stations in the Czech Republic in the last published year 2021. Hourly maximums at these stations ranged from 11.0 µg/m3 (at the background natural air pollution station Churáňov in the Prachatice region) to 251 µg/m3 (at the Lom air pollution station in the Most region). The immission limit for the hourly maximum SO2 is set at 350 µg/m3, and for compliance with the immission limit value it is sufficient if the value of the immission limit is met by the 25th highest hourly immission in the year. The immission limit for the hourly maximum of sulphur dioxide was thus met at all immission stations in the Czech Republic in 2021. In the solved locality, it is possible to estimate the maximum hourly concentrations of SO2 at levels below 200 µg/m3 and thus the fulfilment of the immission limit.

Maximum hourly immission concentrations *of nitrogen dioxide* was monitored at 100 immission stations in the Czech Republic in the last published year 2021. Hourly maximums at these stations ranged from 20.0 µg/m3 (at the Churáňov natural air pollution station in the Prachatice region) to 229 µg/m3 (at the Ostrava Poruba air pollution station). The immission limit value for the hourly maximum NO2 is set at 200 µg/m3, and it is sufficient for compliance with the immission limit value if the value of the immission limit is met by the 19th highest hourly immission in the year. An hourly maximum exceeding 200 µg/m3 was measured in 2021 only at the Ostrava Poruba station, where the second highest hourly immission was lower than the limit value of 200 µg/m3 and 19, the highest value was 77 µg/m3. The immission limit for the hourly maximum was thus met at all air pollution stations in 2021. Hourly maximums below 150 µg/m3 can be expected in the solved locality.

Immission measurements of ammonia concentrations in ISKO are very limited. One of the latest results published in the CHMI yearbooks are air pollution concentrations detected at the Pardubice-Dukla air pollution station in 2014. The average quarterly concentrations at this station this year were 4.7; 4,1; 1,7 and 2,9 µg/m3. In the previous year 2013, a maximum hourly ammonia concentration of 25.2 µg/m3, a maximum daily concentration of 12.9 µg/m and an average annual concentration of 4.2 µg/m3 were detected at this station. In 2012, the hourly maximum at the Pardubice-Dukla air pollution station was 41.5 µg/m3, the daily maximum was 13.5 µg/m3 and the annual average was 5.1 µg/m3.

Immission concentrations of sulphuric acid are not detected at immission stations.

The following table shows the values of concentrations of pollutants in the immission background in the solved locality and their comparison with the valid immission limits.

Table No. 85: Values of pollutant concentrations in the background of immissions and their comparison with valid limits

Harmful substance	Year	Air pollution map 2017 - 2021	Immission limit value	Share im. limit (%)
SO2 (µg/m3)	4. Highest daily immission	11,0 – 13,0	125	8,8 – 10,4
SO2 (µg/m3)	Annual average	3,8 – 4,3	20	19,0 – 21,5
SO2 (µg/m3)	Winter average	4,0 – 4,5	20	20,0 – 22,5
SO2 (µg/m3)	Max. hourly air pollution	< 200 (estimated)	350	< 57,1
PM10 (µg/m3)	36. Highest daily immissions	34,0 – 37,0	50	68,0 – 74,0
	Average annual immission	20,2 – 21,3	40	50,5 – 53,3
PM2,5 (µg/m3)	Average annual immission	14,2 – 15,2	20	71,0 – 76,0
NO2 (µg/m3)	Average annual immission	9,6 – 10,8	40	24,0 – 27,0
	Max. hourly air pollution	< 150 (estimated)	200	< 75,0
Benzene (µg/m^3)	Average annual immission	0,7 – 0,8	5	14,0 – 16,0
BaP (ng/m^3)	Average annual immission	0,8 – 0,9	1	80 – 90
Arsenic (ng/m3)	Average annual immission	1,1 – 1,4	6	18,3 – 23,3
Olovo (ng/m^3)	Average annual immission	3,9 – 4,1	500	0,8

Harmful substance	Year	Air pollution map 2017 - 2021	Immission limit value	Share im. limit (%)
Nikl (ng/m3)	Average annual immission	0,5 - 0,6	20	2,5 - 3,0
Cadmium (ng/m^3)	Average annual immission	0,4	1	40,0
Ammonia	Maximum daily immission	12,9 – 13,5 (Pardubice, Dukla)	100*)	12,9- 13,5

**) the original immission limit value for ammonia specified in the repealed Government Regulation 350/2002 Coll., now without limit*

The project under assessment will be a source of emissions of particulate matter ($PM_{10,}$ PM2.5), sulphuric acid, ammonia, manganese, nitrogen oxides, benzene and benzo(a)pyrene. Of the pollutants addressed, the immission limit is set in the Czech legislation for $NO_{2,}$ PM10, PM2.5, benzene and benzo(a)pyrene. The dispersion study also calculated the immission contribution of manganese contained in particles of airborne dust contained in dust particles emitted from the operation of the processing plan and from resuspension from transport in the tailings area.

From the table (Table No. 5) shows that the immission limits for average annual concentrations of all pollutants that have a limit for the annual average are met in the solved locality. These are the average annual concentrations of NO_2, PM10, PM2,5, benzene and benzo(a)pyrene. The maximum short-term immission concentrations of the pollutants emitted, i.e. NO2 and PM10, are also safely met in the immission background.

2. Water

The impact on groundwater and surface water is summarized in a separate assessment (Frydrych, 2022), which forms Annex 4 to this documentation. The evaluation is based on other expert studies based on drilling, hydrogeological monitoring, groundwater and surface water quality determination and groundwater flow modelling from 2015 – 2022 (e.g. (Francírek, 2019; Kuchovský, Říčka, 2019; Lisovoi, 2021; Lisovoi, 2022).

Water Framework Directive

The area of interest belongs to the area covered by the Plan of the Upper and Middle Elbe River Basin Partial Basin, including for the period 2021 – 2027 (III. planning cycle, in the approval process), which follows the previous II. planning cycle (2015 – 2021) approved by the Hradec Králové, Pardubice, Liberec and Central Bohemian Regions, the Vysočina Region and the Capital City of Prague. This Sub-Basin Management Plan implements the requirements of Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (Framework Directive 2000/60/EC to achieve good water status in three six-year periods with deadlines of 2015, 2021 and 2027).

Sub-basin management plans shall set out the draft programmes of measures necessary to achieve the objectives for the sub-basin concerned on the basis of the established status of surface water and groundwater, the assessment of flood risks, the needs for the use of water resources and the timetable for their implementation. Sub-river basin plans are drawn up by river basin managers according to their competence in cooperation with the relevant regional authorities and central water management authorities. Sub-basin plans are approved by the regions according to their territorial competence.

The sub-basin of the Upper and Middle Elbe with an area of 13,473 km2 makes up approximately 9% of the total area of the International Elbe River Basin District, which is 148,268 km2 and extends to the territory of four countries - Germany, the Czech Republic, Austria and Poland. The sub-basin of the Upper and Middle Elbe is the largest of the ten sub-basins in the Czech Republic, designated for water planning. From the point of view of geographical delimitation, the sub-basin of the Upper and Middle Elbe lies between 49°39´ and 50°86´ north latitude and 14°20´ and 16°47´ east longitude. Altitudes range from 156 m above sea level to 1,603 m above sea level. The ridge of the Krkonoše Mountains, Jizera and Orlické Mountains borders the sub-basins in the north and northeast and at the same time forms the European watershed separating the drainage area of the Baltic and North Seas. The eastern boundary of the catchment area passes through the Králický Sněžník massif, which is the nodal point of the European watershed. The southern boundary of the Upper and Middle Elbe River basins runs through the Bohemian-Moravian Highlands and the Hornosázavská Uplands.

The hydrological regime is influenced by the shape and density of the river network, the length of the stream, the slope conditions, soil and hydrogeological conditions, vegetation cover, the occurrence of reservoirs and stream modifications and many others. The backbone of the river network in the sub-basin is formed by the upper and middle reaches of the Elbe. The hydrographic network is further complemented by the streams Úpa, Metuje, Orlice, Loučná, Chrudimka, Doubrava, Cidlina, Mrlina, Výrovka, Jizera and their less important tributaries.

By the characteristics of the flow and hydrological regime, the Elbe ranks among the rain-snow type streams. The area of the Upper and Middle Elbe River basin is characterized by a winter flood regime (melting snow in mountain and foothill areas together with territorially extensive rainfall in a situation of warm southwesterly flow), except for some left-hand tributaries of the Elbe (Výrovka, Doubrava), where the summer regime prevails. On the upper reaches of the Jizera River, the regime is mixed, which means that significant summer and winter flood waves can occur.

Local differences in precipitation cause significant differences in specific runoffs over the long term. While in catchments such as Horní Labe, Úpa, Divoká Orlice, Jizera specific outflows exceed 10 l.s-1.km-2 (in smaller hydrological units 30 – 38 l.s-1km-2), in lowlands they fall below 3 l.s-1.km-2 (e.g. Brslenka, Mrlina and Mratínský stream). In mountain areas, especially the Krkonoše Mountains, the Orlické and Jizera Mountains, most of the runoff is formed. Lowland areas are dependent on tributaries from these areas.

Details of the cited sub-basin management plan are given here: *https://www.pla.cz/planet/projects/planovaniov2018/detail.aspx?proj=1&kate=138*.

An assessment of the impact on water in relation to water planning is carried out in Annex 4.

Surface waters

According to the hydrological division of the Czech Republic, the area of interest is part of the main Elbe River basin (III. order catchment, Elbe from Chrudimka to Doubrava, ČHP 1-03-04), its sub-basins of the IV. order 1-03-04-0760 and 1-03-04-0750 (Morašický stream). Detailed hydrological data are given in Chapter C.1.1. Information on floodplains and surface water quality is also added.

Floodplains

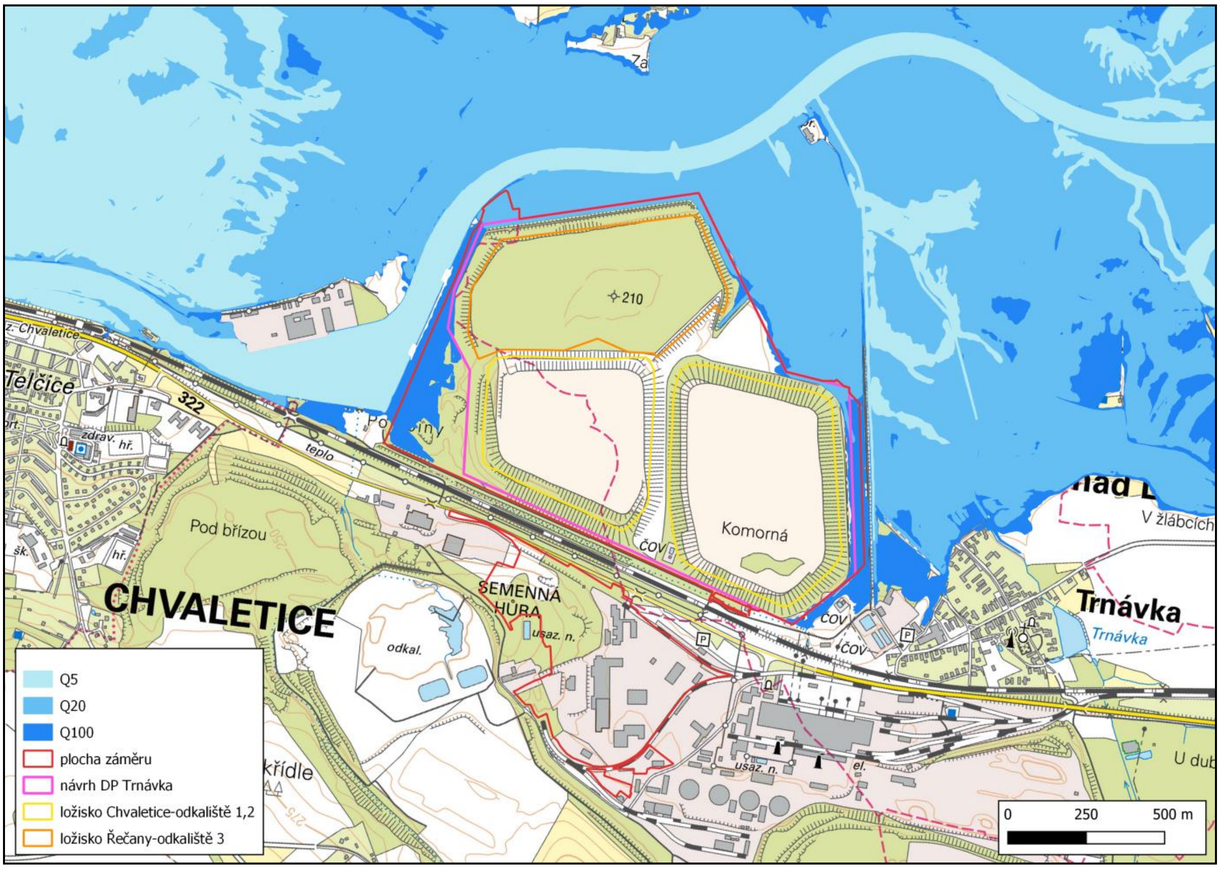
Floodplains are administratively designated areas that can be flooded with water in the event of a flood. In the active zone of floodplains, constructions may not be placed, permitted or carried out, with the exception of water works that regulate the watercourse, transfer flood flows, carry out flood protection measures or that are otherwise related to the watercourse or that improve runoff conditions, structures for water collection, sewage collection and rainwater drainage, as well as necessary transport and technical infrastructure constructions, establishment of hop field structures, if they are established in a floodplain in cadastral areas defined pursuant to Act No. 97/1996 Coll., on the protection of hops, as amended, provided that such measures are taken at the same time that the impact on flood flows is minimized; This does not apply to the maintenance of buildings and building modifications, unless the runoff conditions deteriorate.

In addition, it is prohibited in the active zone:

a) extract minerals and soil in a manner that impairs surface water runoff and carry out landscaping that impairs surface water run-off,
b) store washable materials, substances and articles,
c) to erect fencing, hedges and other similar obstacles,
d) to set up camps, campsites and other temporary accommodation.

Outside the active zone in the floodplain, the water management authority may impose restrictive conditions by means of a measure of a general nature. Where the conditions are amended, it may amend or repeal them in accordance with the same procedure. This procedure is done even if the active zone is not specified.

Picture no. 76: Localization of the project according to the map of floodplains (HEIS, 2022)



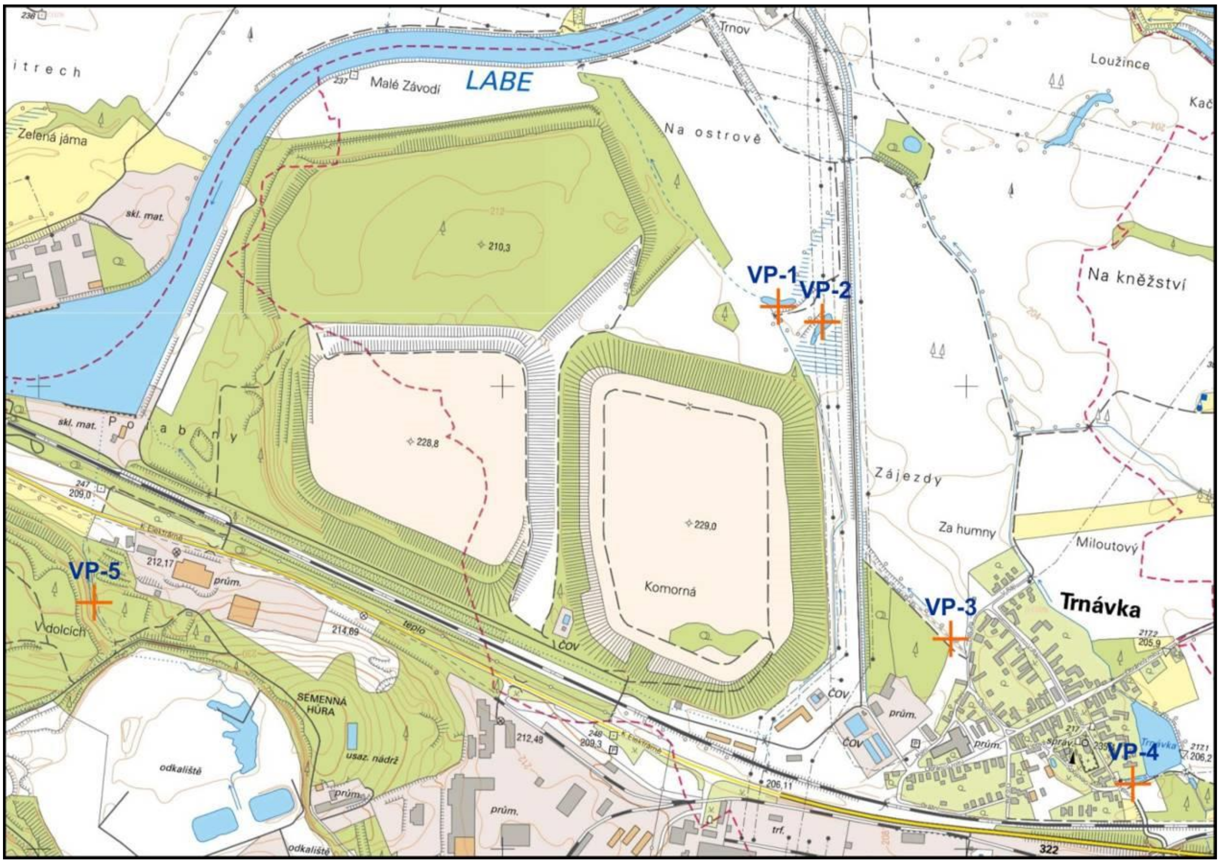
According to the WMS (HEIS, VUV) service Floodplains Q5, Q20 and Q100, the edge of the tailings is in direct contact with the floodplains, especially for hundred-year-old flows. In the case of Q20 flow, the tailings are partially protected by an earth embankment at the northern, north-east and northwest edges. Thanks to this dam and the influence of geomorphology, the bodies of tailings ponds 1 and 3 are protected against flooding during flood flows. During flood flows, the water level extends only to the eastern edge of the tailings pond 2.

The mentioned terrain embankment served either as a flood protection already at the time of the construction of the tailings, or it was the establishment of the northern tailings pond No. 3, which was not completed and therefore did not reach the planned edge.

Geochemistry of surface waters

Monitoring of surface water chemistry is part of a comprehensive study by Geomin (Francírek, 2019). The range of monitored surface water chemistry parameters is the same as for groundwater. Surface water was taken from small bodies of water (VP1, VP2) from a stream flowing from the village of Trnávka (VP3 – No. h. p. 107360003900) and newly also from a pond in Trnávka (sample marked as VP4) and from a stream flowing from a former deposit (sample VP5). The position of surface water abstraction points is shown in the following picture. The results of surface water chemistry were compared with Decree 401/2015 Coll. More attention was paid to manganese, iron, magnesium, phosphorus, sulphates and copper.

Picture no. 77: Bodies of surface water with sampling points for chemical detection



Surface water samples taken in the eastern foreground of tailings show similar pollution as groundwater from tailings and their immediate surroundings. Increased concentrations of manganese (concentration of Mn in the order of units to the first tens of mg/l, max. 194 mg/l), sulphates (concentration of SO_4^{2-} in the order of the first units g/l, max. 4 080 mg/l) and iron

(Fe concentration in the order of tens of units mg/l, max. 85.3 mg/l) were recorded. Increased concentrations of the main pollutants in surface water may indicate that groundwater of tailings flowing from the base of the tailings is drained into nearby streams. Increased phosphorus concentrations may indicate faecal contamination and the use of industrial fertilizers (these pollutants do not come from tailings).

From the point of view of surface water status and water planning, the area of interest is located in the sub-basin of the Upper and Middle Elbe in the surface water body "Elbe from the Chrudimka stream to the Doubrava stream" (Unit ID HSL_1180). The surface water body "Elbe from the Chrudimka stream to the Doubrava stream" is defined as a strongly influenced water body whose status is generally assessed as unsatisfactory. The reason is the unfavorable evaluation of partial indicators of both chemical status and ecological potential. Details are given in Annex 4.

Groundwater

Hydrogeology of the wider area

The area of interest lies on the border of several hydrogeological districts. The area of the tailings itself is part of the hydrogeological districts 6532 - Krystalinikum Železných hory (base layer) and 1140 - Quaternary of the Elbe to Týnec (upper layer), to the north the area of the tailings borders with the hydrogeological district 4360 - Elbe Cretaceous (base layer) and from the east with the district 4310 Chrudim chalk (base layer).

District 1140 - Quaternary of the Elbe after Týnec is characterized by the presence of relatively thick (on average about 10 m, rarely 20 m or more) Quaternary gravelly deposits of the Elbe River in the overburden of the hydrogeological insulator of Upper Cretaceous calcareous claystones to marlstones. The gravelly sediments, which are mostly very well permeable, have been preserved in the form of terrace deposits of various height levels. They create a very important hydrogeological aquifer, which is a source of relatively large groundwater reserves. Considerable variability in terms of grain size and admixture of loamy and clayey predetermines the fact that the permeability of gravelly terrace sediments is quite variable and ranges from 10-7 to 10-3 m/s., while it cannot be said that there are significant differences between the rocks of individual terrace stages. From the point of view of Clover's classification of rocks, gravel-sand deposits of the Elbe River can generally be classified into III. to VI. permeability classes (rocks quite strongly permeable to weakly permeable).

Several types of collectors have been developed in the area of interest, which are often locally interconnected and communicate with each other.

The Proterozoic and Old Palaeozoic rocks protruding in the southern part of the area of interest represent the hydrogeological massif from the hydrogeological point of view. The aquifer of these rocks is relatively poor, characterized by fissure circulation and local dependence on petrographic composition, morphological position and degree of tectonic disturbance. The circulation of groundwater is mainly bound to the zone of near-surface weathering and disconnection of fissures, usually reaching to the depths of the first tens of meters, or to significant tectonic faults. The groundwater level is mostly free, conforming to the terrain. The circulation of groundwater has a local character, the infiltration of atmospheric precipitation occurs practically in the entire area of distribution of crystalline rocks depending on the degree of permeability of the Quaternary cover and the weathered mantle. Drainage of the aquifer takes place in the form of overflow into overlying sedimentary formations of Cretaceous or Quaternary.

The Proterozoic and Old Palaeozoic rocks are joined by Cretaceous rocks, at the base of which a collector of Cenomanian sandstones is developed. The thickness of the collector varies depending on the morphology of the pre-Cretaceous relief, the maximum thickness is close to 30 m, but in some places, it may be completely absent. Cenomanian sandstones with underlying rocks of the Železná hory crystalline mostly form a continuous aquifer. The overlying Turonian marlstones and claystones form an isolation complex, so the groundwater level in the Cenomanian aquifer is usually slightly tense. However, in the case of a smaller overlying sediment thickness or tectonic disturbance, groundwater may flow from the Cenomanian aquifer to the overlying Quaternary formations.

From the hydrogeological point of view, the most important aquifer in the area of interest is developed in fluvial sediments of the Quaternary Elbe terrace. The average thickness of this collector in the vicinity of the area of interest is around 8 m. The aquifer is continuous, the groundwater level is free, in the case of the presence of Holocene loams in the overburden of the aquifer, the level may be slightly tense.

The groundwater flow is directed north to the drainage base formed by the Elbe River. Groundwater of both shallow Quaternary and deeper Cretaceous circulation is drained into it.

Hydrogeology of the deposit and its surroundings

In the area of tailings, we can allocate a separate collector, namely a collector consisting of sediments from treatment sludge with a channel permeability. Its base is defined by a base formed by Elbe terraces, specifically clay loams. During the establishment of the tailings, the necessary technical measures (subsoil insulation) were not used and there is a mutual communication of groundwater from the bodies of the tailings with the underlying collector of the Quaternary Elbe terrace. This fact was verified during the deposit exploration and during the drilling of hydrogeological boreholes in the tailings. Groundwater is found only in the body of the tailings pond 1, where the aquifer can reach a thickness of about 5 m, occasionally groundwater was also found in the tailings pond 2. The collector of the tailings bodies is subsidized only by rainwater infiltration, it is drained by overflow into the underlying Quaternary aquifer or by groundwater flows at the base of the tailings into the surface parts of the soil cover. The communication of the groundwater of the tailings bodies with the surroundings is probably significantly influenced by the blind arm of the Elbe, which passes under the tailings pond 3, as well as by the channels of small watercourses covered by depots on the original terrain surface. These structures can thus act as preferential routes for the drainage of tailings. Partial drainage of tailings into the Cenomanian aquifer cannot be completely ruled out. In the southeastern foreland of the tailings Cenomanian sediments rise to the surface, so there is no overlying insulating layer of Turonian sediments. The flow of groundwater in the Quaternary aquifer of fluvial sediments in the subsoil of the tailings is directed northeast towards the Elbe. The groundwater level in the bodies of the tailings pond creates flat elevations, from where it flows in all directions.

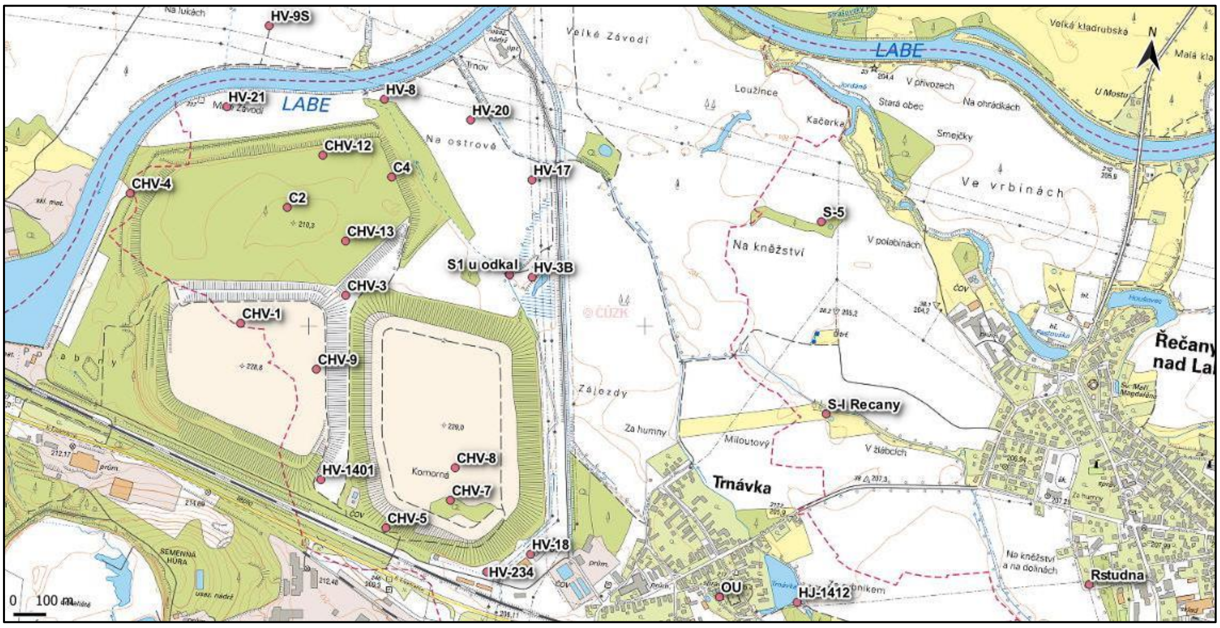
The hydraulic conductivity of the tailing's material ranges from 3.10-6 to 7.10-7 m/s and the transmissiveness in the range of 2.10-5 - 5.10-6 m2/s, which corresponds to the hydraulic properties of the predominant component of the dusty material. In the foreland and wider surroundings of the tailings, similar hydraulic characteristics were found in the Quaternary formations, i.e. average values of conductivity in the order of n.10-6 - n.10-7 m/s and transmissivity in the order of n.10-5 - n.10-6 m2/s, while they show a higher dispersion of values (n.10-4 - n.10-8 m/s) depending on the nature of the caught rock and the degree of aquifer

.

Groundwater quality

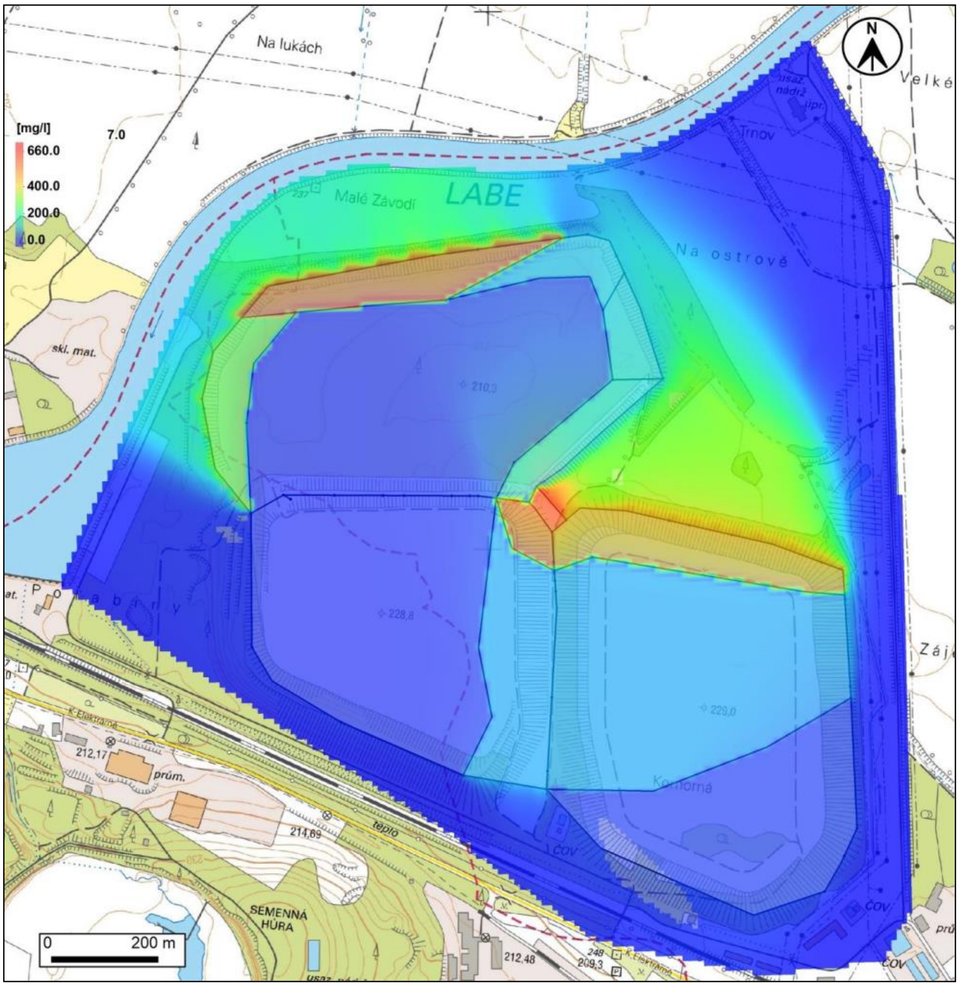
The chemistry of groundwater in the tailings and in its vicinity, as well as in the wider surroundings, is significantly influenced by anthropogenic activities. The source of groundwater and surface water pollution in the territory is the original mining activity at the site, tailings depot and tailings bodies, as well as the coal and fly ash inter-depots of the power plant and the MSW (municipal solid waste) landfill. Regular monitoring has been taking place in the wider area of interest since 2016. Boreholes in the area of the tailings or in its immediate vicinity, older boreholes and wells in the area of Řečany nad Labem and Trnávky (Picture no. 78). It is assumed that the monitoring will continue throughout the preparation and implementation of the plan and even after the termination of the activity.

Picture no. 78: Water monitoring objects in the area of interest



Groundwater samples from the area of the tailings and its immediate surroundings show a significant increase in the concentrations of some parameters, especially manganese (concentration of Mn in the order of tens to the first hundreds of mg/l, max. 997 mg/l), sulphates (concentration of SO_4^{2-} in the order of the first units g/l, max. 9 200 mg/l), iron (Fe concentration in the order of tens to the first hundreds of mg/l, max. 979 mg/l), aluminium (concentration of Al in the order of tenths to the first units of mg/l, max. 22.9 mg/l), ammonium ions and in some cases also in chromium, lead, zinc. Other monitored parameters also show a smaller or larger increase in comparison with, for example, hygienic limits for drinking water, but they do not reach such values as the above parameters. The increased concentrations of monitored parameters are directly related to the deposited material at the tailings. Significant pollution is caused by pyrite, which comes from the original mined Cyza shales, which include manganese. Other contaminants come from the treatment of shales. According to the results of the transport model, up to 45.5 kg Mn, 37.6 kg Fe and 234 kg S could be released daily from the tailings material into the Elbe via groundwaterPicture no. 79).

Picture no. 79: Extent of contamination of shallow aquifer Mn (Kuchovský and Říčka, 2019)



House wells in the surrounding villages (Trnávka, Chvaletice-Telčice) show a much lower influence on groundwater chemistry. In the analyzed samples, increased concentrations of manganese (concentration of Mn up to the first hundredths of mg/l, max. 0.35 mg/l) and iron (Fe concentration mostly in the first tenths of mg/l, max. 1.31 mg/l) and nitrates (concentration of NO3- in higher tens of mg/l, max. 188 mg/l) were recorded in comparison with hygienic limits for drinking water. However, the tailings do not have a direct impact on the quality of groundwater in these objects, because they are located upstream of groundwater. The quality of groundwater in house wells will most likely be influenced by the original mining and tailings dumps, or by the repository of power plant fly ash in the former quarry. The waters of the tailings dump of the former quarry (the so-called eastern dump situated in the elevation of the Strážník Hornická čtvrť and the western dump in the Chvaletice elevation) are characterized by strongly mineralized waters with high sulphate and manganese contents.

Surface water samples taken in the eastern foreground of the tailings show similar pollution as groundwater from the tailings and the surrounding area. Increased concentrations of manganese (concentration of Mn in the order of units to the first tens of mg/l, max. 194 mg/l), sulphates (concentration of SO_4^{2-} in the order of the first unit g/l, max. 4 080 mg/l) and iron (Fe concentration in the order of tens of unit mg/l, max. 85.3 mg/l) were recorded. Increased concentrations of the main pollutants in surface water may indicate that groundwater from the bodies of the tailings flowing from the tailings bases is drained into nearby streams.

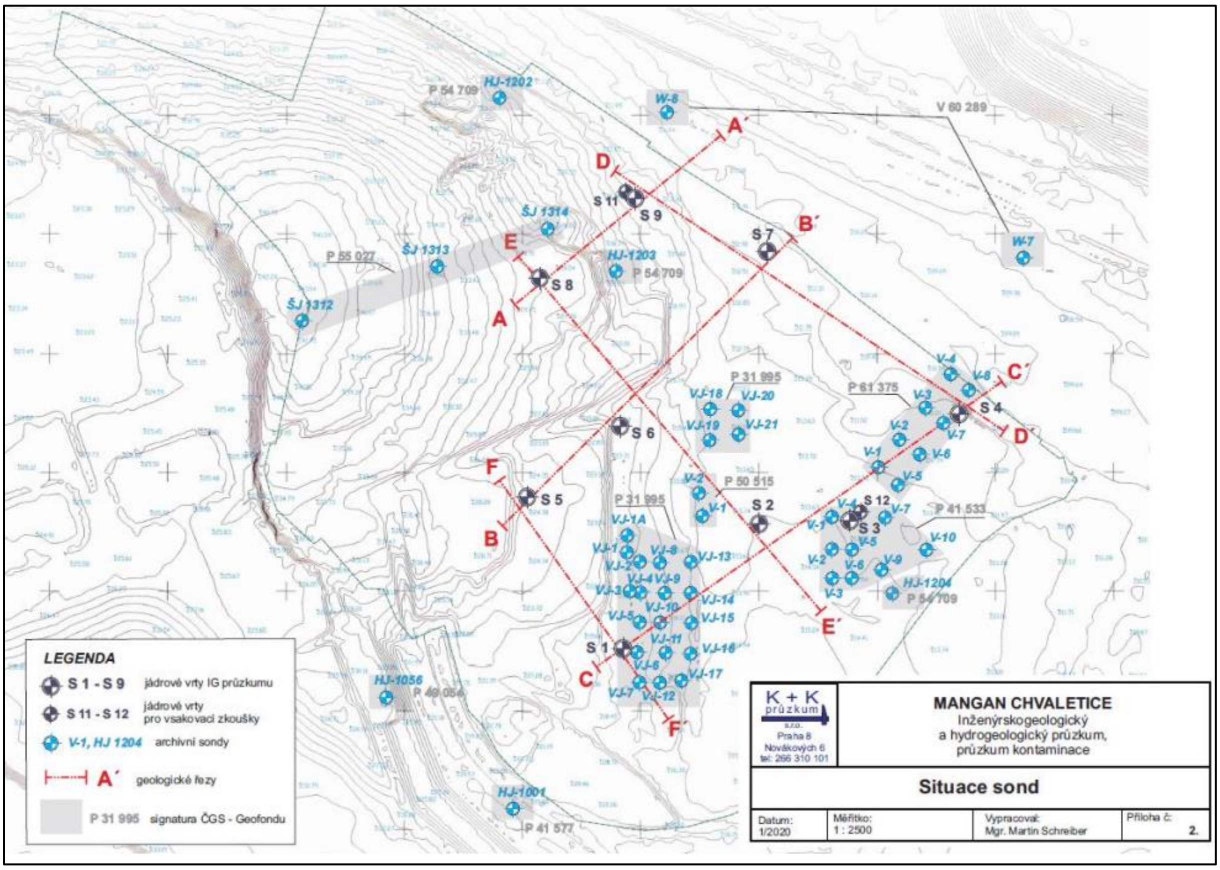
Hydrogeological conditions in the area of the processing plant

The hydrogeological conditions of the area of interest are conditioned by a number of factors, the decisive of which are the morphology of the terrain, the geological structure of the territory, the permeability of individual geological environments and anthropogenic influences. An engineering-geological and hydrogeological survey was carried out for the territory of the processing plant. (Schreiber, 2020)

The area of interest lies at the contact of Cenomanian sandstones and marlstones with older Proterozoic rocks. The sandstones, which are located in the central and eastern part of the area of interest, are characterized by good penetration-fissure permeability and form a relatively high-quality hydrogeological aquifer. In sandstones, groundwater is usually bound to their basal positions, where it is held on relatively less permeable bedrock shales of the Ordovician. Cretaceous sandstones are a favorable environment for the formation of a continuous aquifer with a fissure-fissure character, and therefore the tributaries from this environment sometimes reach relatively high yields. The subsidy from the chalk aquifer therefore has a decisive influence on the hydrogeological conditions of the wider area. Proterozoic shales are characterized by limited fissure permeability, in the unweathered state they are practically impermeable, because they have fissures closed or clayeed. There is no stable and continuous horizon and water circulates very limitedly on suitable predisposed structures. Groundwater also extends into the environment of Cretaceous marlstones, which are characterized by very limited fissure permeability, and Quaternary sandy clays, which are limited in transpermeable lines.

The direction of groundwater flow is approximately the same as the direction of the slope of the terrain, i.e. roughly from south-south-southwest to north-northeast, towards the Elbe. As part of the engineering-geological and hydrogeological survey, a total of 11 new core boreholes were drilled, of which 9 were deeper boreholes for the purposes of verifying the engineering-geological conditions of the site and 2 shallower boreholes for hydrogeological assessment of the possibility of infiltration. In the area of the complex, 9 deeper boreholes were relatively evenly distributed, which extend to depths of 6.00-11.00 m.

Picture no. 80: Localization of exploration probes in the processing plant area (Schreiber, 2020)



In the area of interest, the groundwater level in the new boreholes was found at a depth of 2.16-7.64 m below the terrain, at a height of 207.61-216.86 m above sea level. The groundwater habitat is represented by both Quaternary clays, which are limited permeable and Cretaceous sandstones with relatively higher livine-fissure permeability, as well as limited permeable marlstones and shales. As part of the hydrogeological survey, the possibility of liquidation of rainwater by infiltration was verified. To determine the indicative hydraulic parameters, specifically the infiltration coefficient, boreholes S 11 and S 12 were specially prepared for the implementation of infusion infiltration tests. The infiltration tests were performed as variable-level tests. From the results of the infusion test in borehole S 11 the value of the absorption coefficient kv = 1.01.10-6 m.s-1 was determined for the clay soil environment. From the results of the infusion test in borehole S12, the value of the absorption coefficient kv = 1.45.10-5 m.s-1 was determined for the environment of Quaternary sands in the subsoil with Cretaceous sandstones. (Schreiber, 2020)

The decisive factor for the eventual design of the infiltration system is the level of steady groundwater level, which at the time of the exploration work is located at a depth of 2.16-7.64 m below the ground, at elevations 207.61-216.86 m above sea level. This means that for the design of infiltration objects, there is only a very limited thickness of the unsaturated zone into which it is possible to place infiltration objects, so that the condition of the standard to design the bottom of the infiltration objects at least 1 m above the groundwater level is met. In addition, the upper zone of the geological profile consists of heterogeneous fills that cannot be used as an environment for the location of infiltration objects due to the expected secondary consolidation due to infiltration rainwater and the possibility of creating shallow groundwater horizons in more permeable positions with negative effects on the proposed building structures. Due to the relatively shallow groundwater level, moreover, taking into account the occurrence of landfills in the upper zone of the geological profile, the conditions for the disposal of rainwater at the site must be described as unsuitable.

A survey of contamination was carried out in the area of interest in order to determine the current state in terms of possible pollution of the geological environment. Potential sources of pollution may be old loads from the original operations in the area. A full chemical analysis was performed on groundwater samples, supplemented by the determination of the concentration of C10-C40 hydrocarbons, trace metals, chlorinated aliphatic hydrocarbons, monocyclic aromatic hydrocarbons (BTEX), polycyclic aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs). The detected concentrations of the analyzed elements were compared with the criteria according to the Methodological Guideline of the Ministry of the Environment Pollution Indicators (2014). Groundwater pollution was not detected on the basis of the analyses carried out, with the exception of the increased nickel concentration that was found in the S4 borehole at 0.45 mgl-1, while the limit is set at the level of 0.02 mgl-1 according to the Methodological Instruction of the Ministry of the Environment. This finding is not considered to be a significant contamination, although it probably indicates industrial activities carried out in the area of interest in the past.

Groundwater resources

Protected areas of natural water accumulation (CHOPAV)

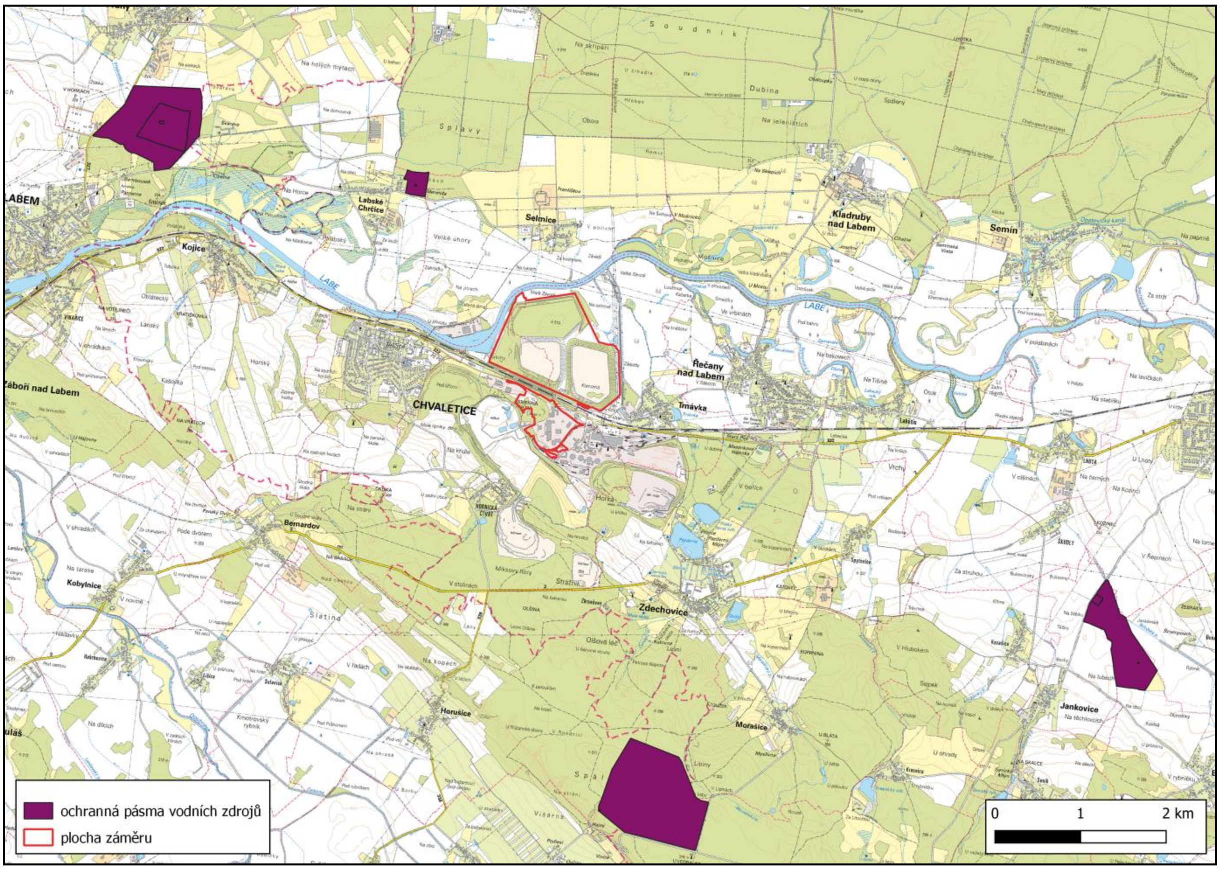
Protected areas of natural water accumulation (CHOPAV) are defined in §28 of Act No. 254/2001 Coll., on Water. There are no CHOPAV areas on the project area or in its wide surroundings. The nearest such locality is CHOPAV Východočeská křída (East Bohemian Cretaceous), located about 38 km north of the project border.

Water Source Protection Zones (OPVZ)

Protective zones of water resources defined according to Section 30 of Act No. 254/2001 Coll., on Water, serve to protect the yield, quality and health safety of groundwater or surface water sources used or usable for drinking water supply with an average abstraction of more than 10,000 m3 per year and groundwater sources for the production of bottled infant water or spring water, the water management authority establishes protection zones by measures of a general nature. If serious circumstances so require, the water authority may establish protection zones also for water resources with a lower capacity than specified in the first sentence. The water management authority may change the protection zone or cancel it for serious reasons. The establishment of buffer zones is always in the public interest.

According to TGM WRI HEIS, there is no OPVZ water source on the project area or in its vicinity. The nearest such area is OPVZ used to supply public water supply in the village of Labské Chrčice, which is located about 1.6 km from the project area, but in a different hydrogeological environment on the opposite bank of the Elbe River, which forms a hydraulic barrier here.

Picture no. 81: Location of water resources buffer zones relative to the project (HEIS, 2022)



Natural Healing Source Protection Zone (OPPLZ)

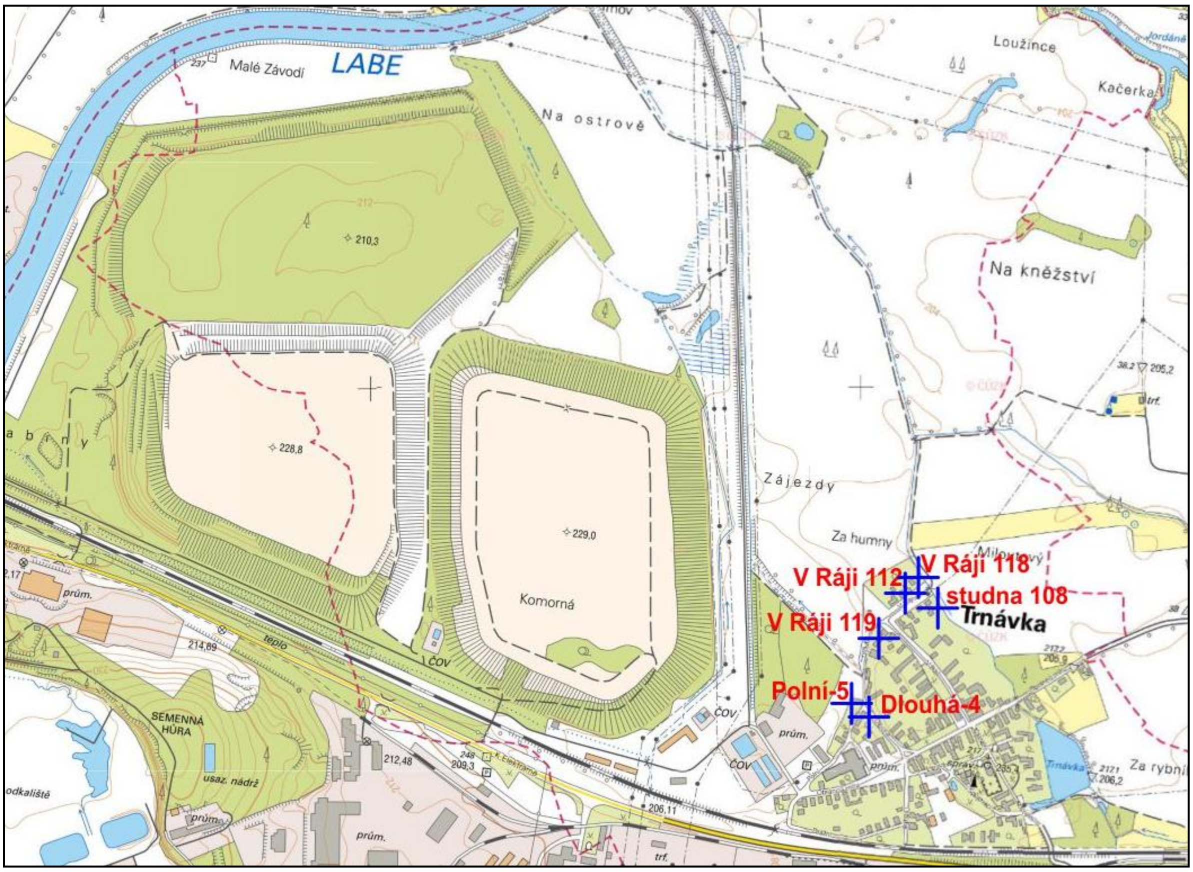
The protection of natural healing resources is ensured by Act No. 164/2001 Coll., the Spa Act. In order to protect the source from activities that may adversely affect its chemical, physical and microbiological properties, its wholesomeness, as well as the reserves and yield of the source, the protection zones shall be established by the Ministry in a decree.

According to the map layer Protected areas of the digital water management data base (DIBAVOD), there is no OPPLZ on the project area or in its wide surroundings. The nearest such area is OPPLZ Poděbrady, which is located about 17 km northwest of the project.

Other water resources

In the surrounding villages there are also house wells for individual water supply. From the point of view of possible impact, the wells in the village of Trnávka are particularly relevant. As part of the above-mentioned hydrogeological works, a survey of water quality was carried out here as well. The village of Trnávka is connected to the public water supply.

Picture no. 82: Position of house wells with monitored groundwater chemistry (Francírek, 2019)



3. *Soil*

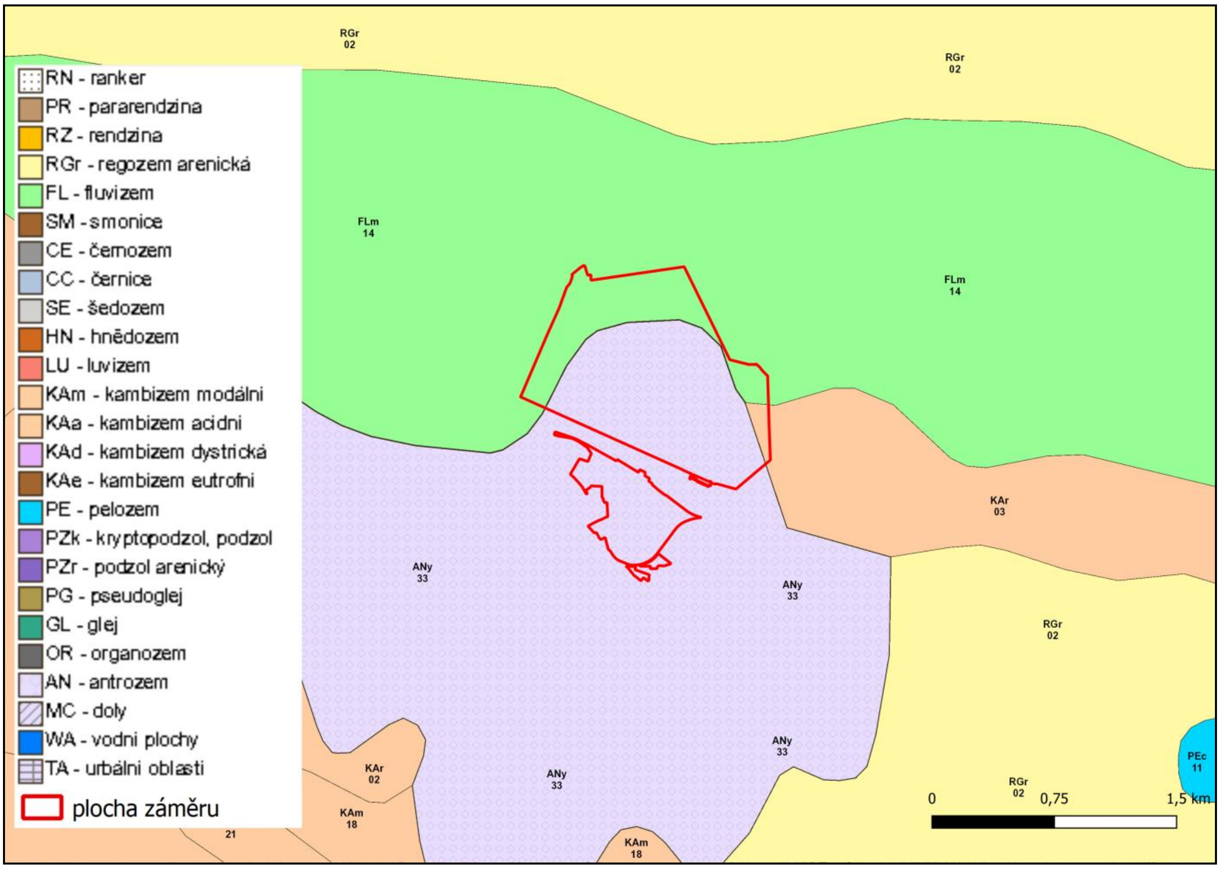
Taxonomic characteristics of soils in the area of interest

In the Czech Republic, the classification of soil types according to the taxonomic classification system of soils (TKSP), the international system of the World Reference Base for Soils Resources 2006 (WRB), is used.

The taxonomic categories of the system consist in particular:

- Reference classes of soils - large groups of soils that appear in foreign classification systems (mainly WRB) and allow Czech soils to correlate with them (noun ending in sol),
- Soil types - the main supporting units of the classification system, characterized by certain diagnostic horizons and their sequences or diagnostic features (noun neverending – sol),
- Soil subtypes - significant modifications of the soil type according to the characters at a depth below 0.20 – 0.25 m (adjective after the noun),
- Soil varieties - characterize the occurrence of horizons and signs in the upper 0.20-0.25 m in forest soils, further express less pronounced features in the soil profile than subtype (the second adjective after the noun).

Picture no. 83: Localization of the project according to the map of soil types according to TKSP (geoportal.gov.cz, 2022)



There are three types of soils on the project area, namely:

<u>Soil classification according to TKSP1</u>:	Anthropopose heap (ANy)
	Fluvizem modální (FLm)
	Kambism arenická (KAr)
<u>Soil classification according to WRB1:</u>	Regic Anthrosols (rgAT)
	Haplic Fluvisols (haFL)
	Areni-eutric Cambisols (areuCM)

<u>ANTHROPOPOSE AN</u>

Soil formed or created from man-made substrates obtained during mining and construction activities. The character of soils is given by the properties of the original material, anthropogenic layering or mixing of material, as well as by the regulation of the process of pedogenesis after reclamation, following the modification of soil properties for agricultural, forestry, recreational use. The mere layering of materials creates only anthropic substrates. Specific conditions may be created after the reclamation of landfills.

<u>FLUVIZEM FL</u>

fluvizem modal – FLm – from medium-heavy substrates

Soils with O–Ah or Ap–M–C stratigraphy, characterised only by fluvic features (layering, irregular distribution of organic matter containing up to > 0,3 % to a depth of 0,6 m). The formation of the cambic horizon is difficult to prove, in the profile can be found neoplasms similar to argillans, which are formed during water infiltration during flooding. Soils are formed in the floodplains of rivers and streams from flood sediments.

Cambisol KA

Cambisol arenic – KAr with a grain size of 1 at a depth of up to 0.6 m

Soils with O-Ah or Ap- Bv-IIC stratigraphy, with a Cambic brown (braunified) horizon, developed mainly in the main formation of slopes of magmatic, metamorphic and sedimentary rocks, but also in their corresponding formations, e.g. in unconsolidated light to moderate sediments. Even the more strongly developed peds in the Cambic horizon lack clay coatings – argilanes.

Soils are formed mainly in sloping conditions of hills, highlands and highlands, to a lesser extent (loose substrates) in flat relief. The formation of these soils from such a diverse spectrum of substrates determines their great diversity in terms of trophism, granularity and skeletality, while applying more or less significant profile stratification of grain size, skeletality, as well as chemical (biogenic elements, trace potentially risky elements) and physical properties (relief of the basal formation, influencing the lateral movement of water in the landscape). In the main formation, the granular composition generally shifts to the middle category in relation to the basal formation, which is also supported by their enrichment with dust.

Soils also occur in a wide range of climatic and vegetation conditions, in climatic regions B 2-8, Ko 2-8, Ku 3-6.2-4(5) and vegetation stages 6 in eubasic and mesobasic Cambisols and B 8-10, Ko 4-9, Ku 6-8.5-7 and vegetation stages 6-7. They are characterized by mesic to frigid temperature and udic to perudic hydric regime. The occurrence of soils in such a wide range of climatic and vegetation conditions determines the differences in humus accumulation and quality, in soil profile leaching, weathering, braunification, interaction with substrate properties.

According to specific substrate, climatic and vegetation conditions, we find all forms of overlying humus in Cambisols. In addition to the normal Ah horizon, the formation of melanic, umbric and Andean humus horizons is possible, determining varieties to subtypes of Cambisols. Towards colder and more humid areas, the humus content increases in topsoil (1-6%) and in Bv horizons (0.4 to above 1.0%). At the same time, as acidification increases, the ratio of HK: PK decreases, the proportion of weakly bound HK and free aggressive PK migrating to the Bv horizon increases, and the color quotient Q4/6 increases as an indicator of weak condensation of humus substances. The content and quality of humus increases from the lightest to heavier soils and soils from eutrophic substrates.

A wide range of substrates and climatic conditions is reflected in the saturation of the sorption complex. According to the saturation of VM in hroizont Bv, soils can be classified to the EU – (VM > 60%, V > 50% forest), meso – (VM > 60 – 30 % agricultural, 50 – 20 % forest land) to oligobasic (VM < 30 % agricultural, V > 20 % forest land). In the diagnosis of these stages, saturation of the sorption complex with exchangeable aluminium (VAl > 30% in the oligobasic stage) helps us. Acidification is also reflected in an increase in amorphous Feo and pH-dependent cationic exchange capacity (KVK).

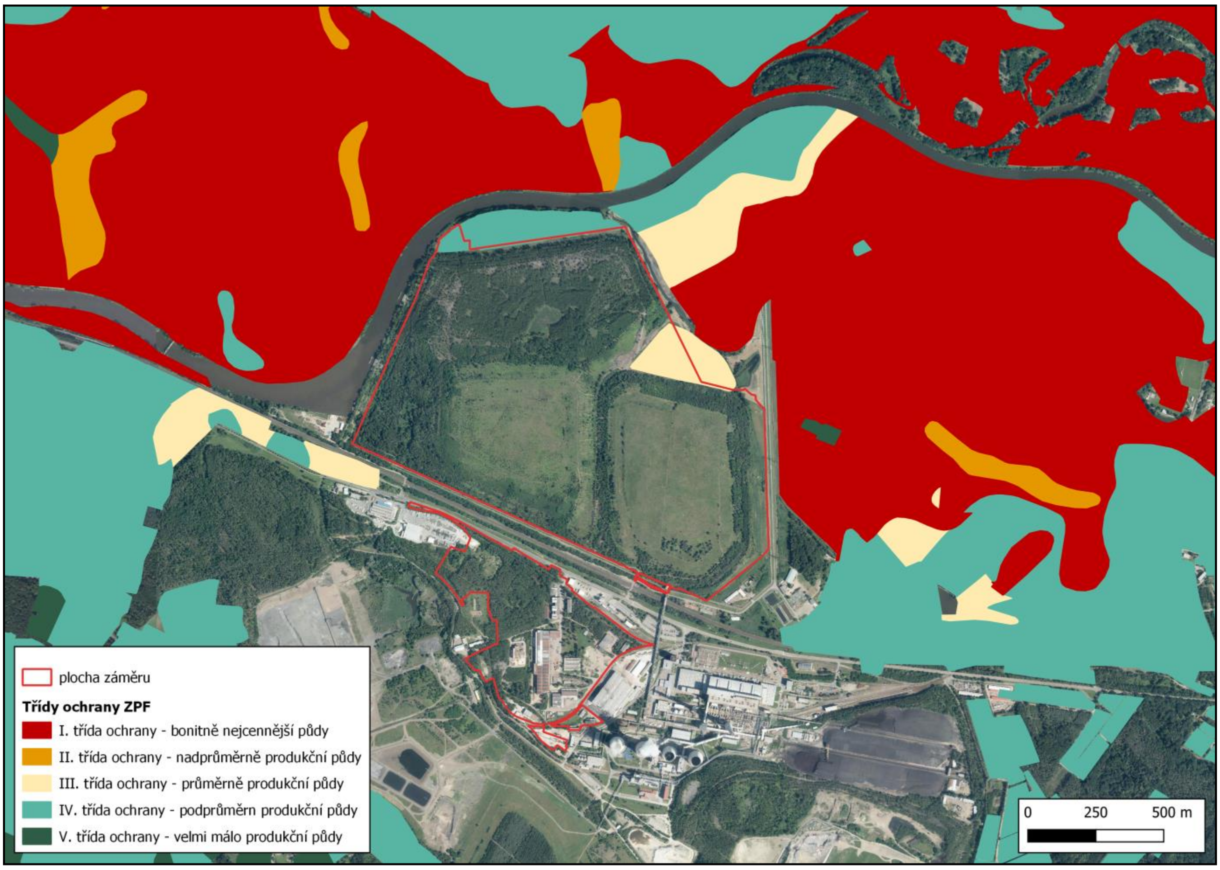
Soil cover of the area of interest

As stated in Part B, the vast majority of the area of interest does not contain agricultural land resources. Only at the northern edge and in the eastern part does the proposed DP marginally extend into the ZPF plots of approximately 5.58 ha. These are plots falling under the III. and IV. class of protection ZPF, i.e. land of average and below-average production land.

It is clear from the above map of soil types that the definition of soil types is generalized and is not accurate at the microscale of the area of interest. In fact, practically the entire area of the area of interest is covered by anthropopose, because it is a body of anthropogenic origin and an area of beownfield character. Only at the edges of the proposed mining area there is a natural soil cover. The only enclaves of natural land that will be affected are located at the NW and in the edge of the proposed DP Trnávka area, above the tailings pond No. 3 and between the tailings pond No. 2 and 3

These enclaves are clearly visible in the following picture. It is a section from the map of ZPF protection classes published on the SowacGIS Geoportal, which is administered by the Research Institute of Amelioration and Soil Protection, v.v.i. (VÚMOP). According to the picture (Picture no. 84) it is apparent that the enclaves in question belong to ZPF protection classes III and IV.

Picture no. 84: Localization of the area of interest in maps of ZPF protection classes (geoportal.vumop.cz, 2022)



It is also clear from the map that in the immediate vicinity of the proposed MGL there are soils I., III. and Class IV protection of ZPF.

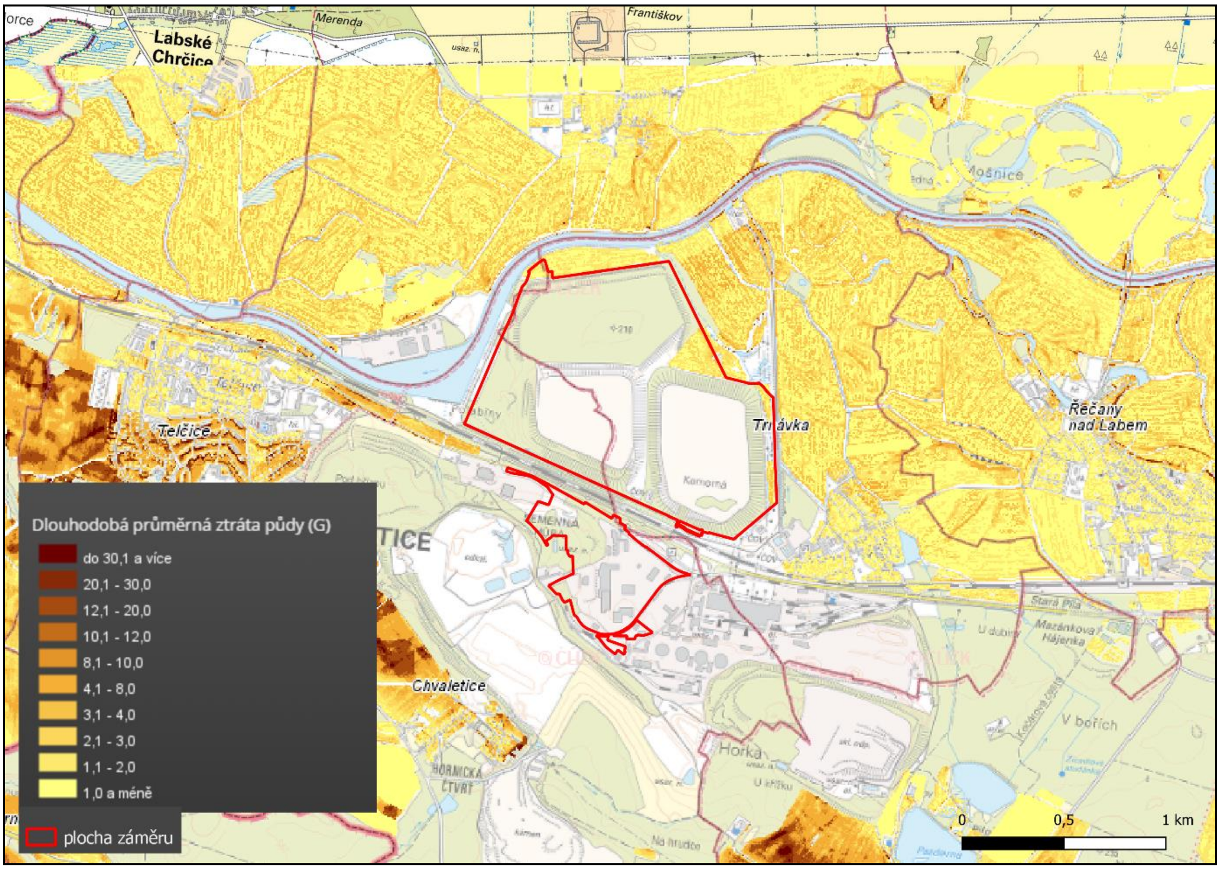
A more detailed description of the materials that overlap the deposits themselves and were brought here in the past during reclamation is given in Part B.

Soil erosion and degradation

Soil degradation is considered to be its loss of ability to perform its natural functions (production, cultural and non-production). Soils in the Czech Republic are threatened mainly by water and wind erosion. Other factors of soil degradation include land sealing, acidification, dehumification, compaction and pollution. The project lies only on forest land, so it is not affected by the erosion threat of ZPF. The issue of forest soils is included in the forest impact assessment.

According to the SOWAC-GIS geoportal, the area around and partly in the area of interest is an area at low risk of erosion. Soil drift mostly ranges from 1.1 to 3.0 t*ha-1*year-1.

Picture no. 85: Long-term average loss of land in the area of interest (geoportal.gov.cz, 2022)



4. *Natural resources*

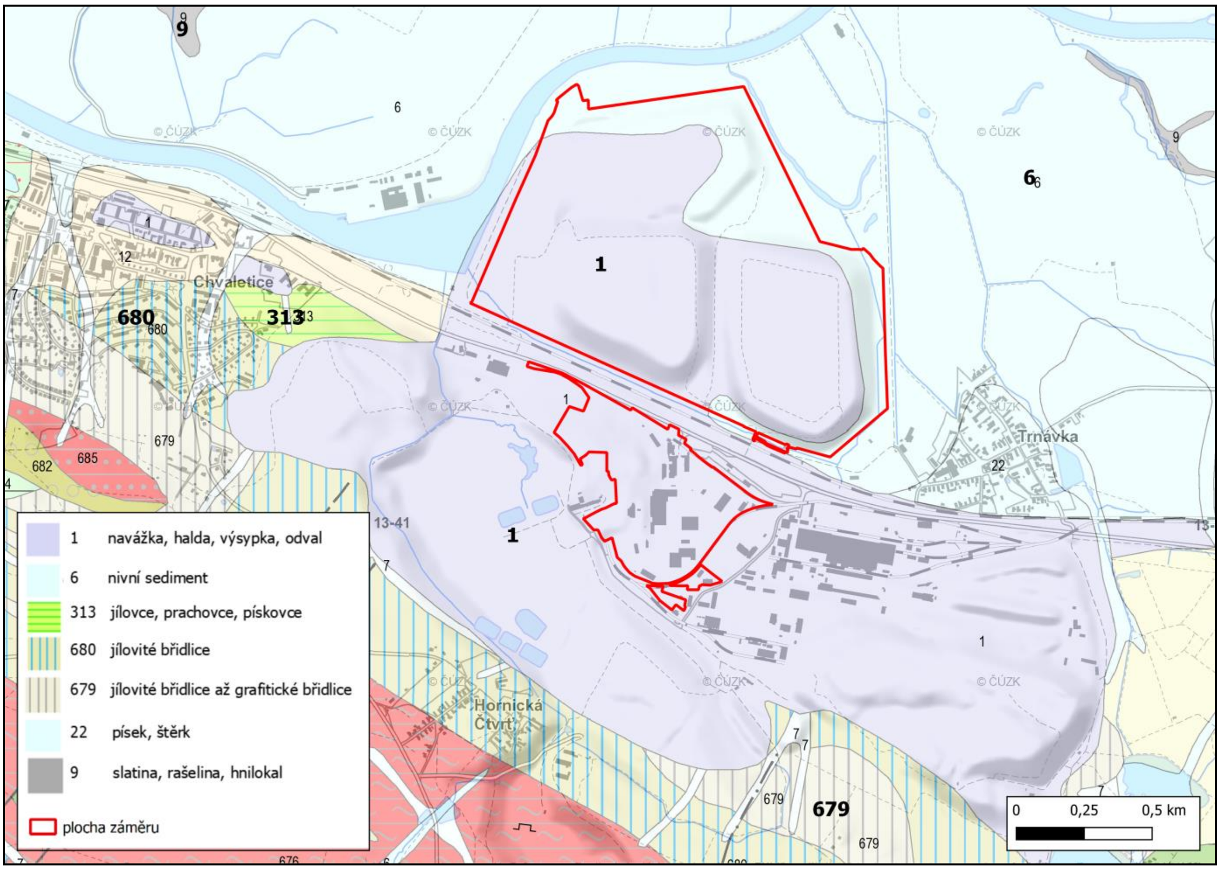
Geological characteristics of the wider area

According to the geological map at a scale of 1 : 50,000, there are two geological units in the area of interest. The bulk of the area consists of undifferentiated geological unit 1 – landfill, heap, dump or dump (unconsolidated sediment). The northern marginal part consists of geological unit 6 – unconsolidated alluvial sediment (clay, sand, gravel).

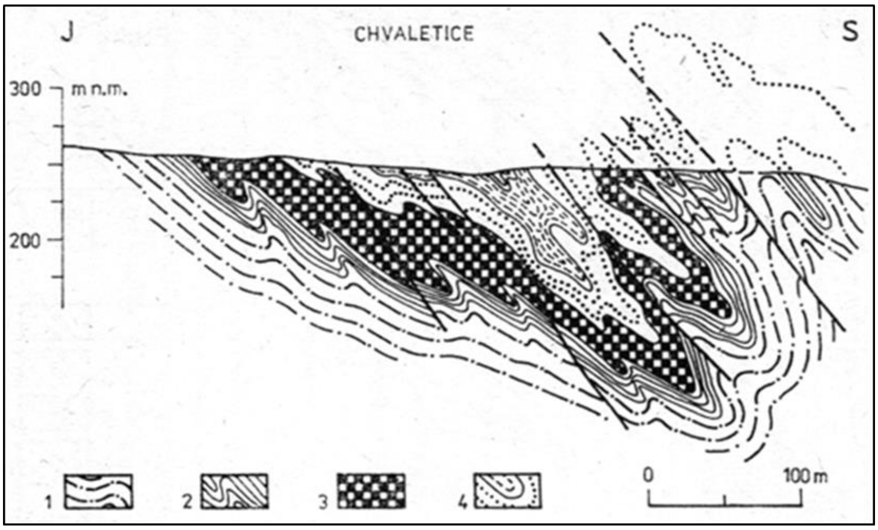
The geological structure of the primary manganese-Kyz deposit of Chvaletice (south of the site) and its surroundings is described in detail in the final report on the liquidation calculation of reserves (Kavalec et al. 1978). The deposit is deposited in weakly metamorphosed and intensively folded sediments of the Iron Mountain Neoproterozoic. Proterozoic rocks in the northeast fall under the Cretaceous and Old Paleozoic formations, in the south and southwest they meet the Chvaletice granite massif. Both the granitoid massif and the Proterozoic are penetrated by smaller bodies of gabers and gabodiases. The Upper Proterozoic is several hundred meters thick.

The Chvaletice deposit of Kyz shales and iron-manganese ores consists of graphitic shales with a greater or lesser proportion of sulphides (pyrite), passing into Kyz shales and in places into rich Kyz ores.

Picture no. 86: Localization of the project area according to the geological map of the Czech Republic (mapy.geology.cz, 2022)



Picture no. 87: Schematic section of the manganese-Kyz deposit in Chvaletice (Mikuš, 1960)



<u>Explanatory notes:</u>
1 bedrock shale, 2 bedrock schists, 3 pyrite-manganese ore, 4 overlying slate and sericitic schists

Geological characteristics of the deposit itself

The deposits Chvaletice-tailings ponds 1,2 and Řečany-tailings pond 3 are of anthropogenic origin. It was created by depositing waste from flotation treatment of the raw material of the Chvaletice pyrite and manganese ore deposit. (See Part B for details). Tailings were established in such a way that the bottom was partially modified, and the foundation dams were built. The bottoms of individual tailings are not completely straight. The greatest height differences are at the bottom of body 3 (i.e. the Řečany-tailings pond 3), where a blind Elbe meander took place before the establishment of the tailings.

In archive boreholes, the deepest dimension is 195.3 m (V-42-86) and the highest 204.4 m (V85H-88), in newly drilling it is in the range of 199.3 – 205.0 m above sea level. The flotation sludge was deposited episodically throughout the production of the pyrite concentrate. All flotation wastes except parts of the top oxidized layer are considered to be raw materials.

The tailings were based on Holocene fluvial loams of ochre-brown to grey-brown colours with a variable proportion of sandy and slightly gravelly fractions. Characteristic is only a few centimeters thick layer of black plant detritus based on the tailing’s material. The clays formed a sealing layer that was supposed to isolate the tailings from the underlying permeable gravel sands and sands. Before the establishment of the tailings, the clay in the peripheral parts was summarized to create basic dams. In drilling profiles, it is practically impossible to distinguish clay partially displaced from clay in situ.

Below the Holocene loams there are Pleistocene fluvial sands and gravel sands of the lowest terrace 0 – 2 m (würm 3) of the Elbe River. The sands are medium to coarse-grained, coarse towards the subsoil into gravel. The color is gray-brown, brown to ocher.

From an altitude of about 195 m, archive boreholes found chalk rocks, represented by light gray to gray marlstones, sometimes powdery, fragmentary decaying. They are probably classified as Turonian.

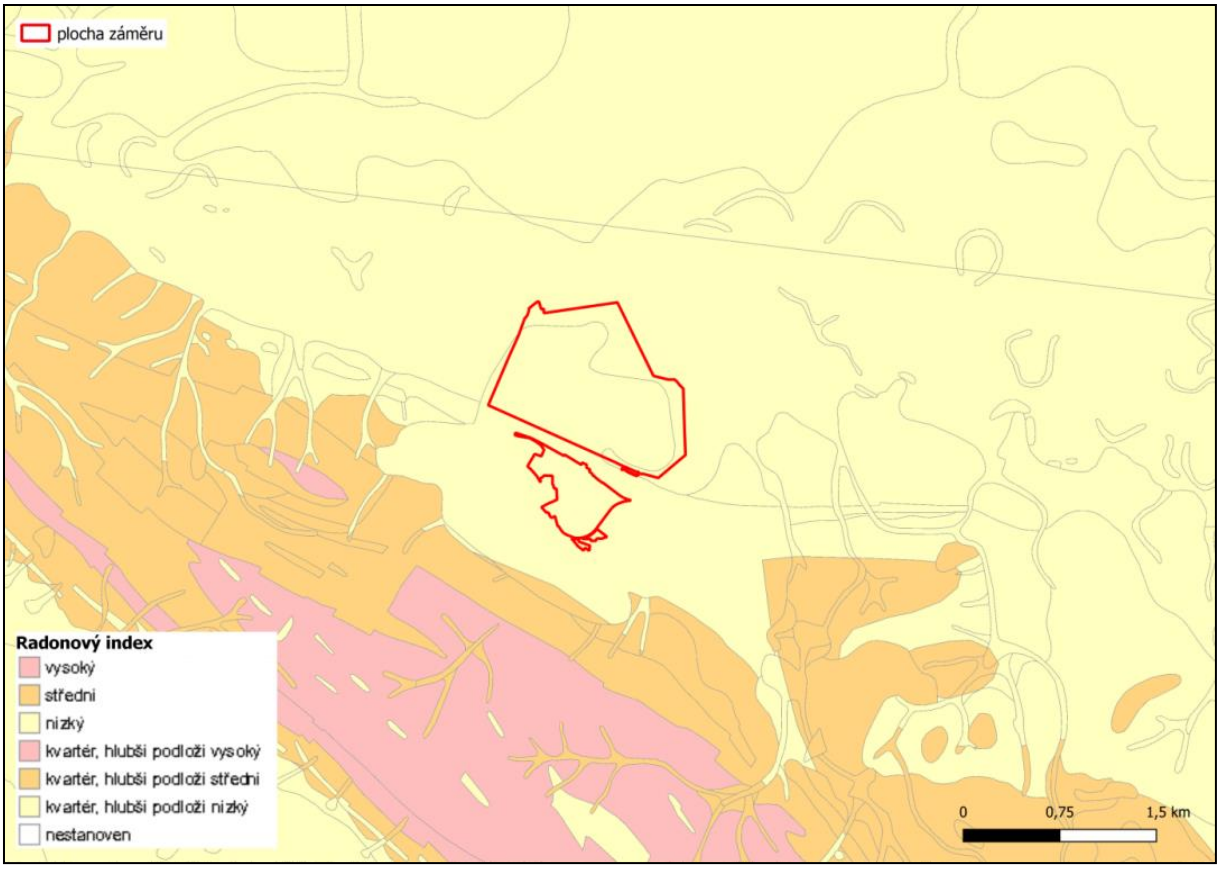
Geological conditions in the processing plant area

Within the engineering-geological survey, the geological conditions in the area of interest were verified. The pre-Quaternary substrate consists of rocks of the Upper Proterozoic Chvaletic group represented by powdery, sometimes clayey shales. In the eastern part of the area of interest there are sediments of the Upper Cretaceous - Cenomanian represented by the Peruc-Korycany and partly also the White Mountain Formations. Cretaceous rocks were found in the area of the projected construction by probes S 1, S 2, S 3, S 4, S 6, S 7. Proterozoic rocks at probes S 5, S 9 and S 11 form directly the surface of the pre-Quaternary substrate and at the probes S 1, S 2 and S 3 they were found in the bedrock of Upper Cretaceous sediments. The location of the exploration probes is clear from the picture ((Schreiber, 2020)Picture no. 80) in Chapter C.II.2. The surface of the Proterozoic Pre-Quaternary substratum rocks occurs at a depth of 0.20-2.60 m below the terrain, at elevations of 213.10-224.30 m above sea level, where the Proterozoic rocks are covered by Cretaceous sediments of relatively lower thicknesses (boreholes S 1, S 2 and S 3), the surface of the shale is located at a depth of 3.80-9.00 m below the ground, at a height of 204.70-212.30 m above sea level. In the central and northeastern part of the area of interest (boreholes S 4, S 6 and S 7), Proterozoic shales were not found in the Cretaceous bedrock to depths of 6.00-9.00 m below the terrain. Proterozoic sediments in the central and eastern part of the area of interest are discordantly composed of sediments of the Czech Cretaceous Table. Their occurrence was recorded in boreholes S 1-S 4 and S 6-S 7. Towards the west, their power steadily diminishes until they disappear completely. In the western part of the site (boreholes S 5, S 9 and S 11) they no longer occur. There are more extensive sandstones of the Peruc-Korycany Formation, which were found in all the above-mentioned boreholes and younger, less widespread marlstones of the White Mountain Formation, which were described only in boreholes S 1 and S 6. The rocks of the Cenomanian Peruc-Korycany Formation are predominantly fine-grained to medium-grained quartz sandstones, with kaolinitic mastic, bench-layered with characteristic diagonal layering, ferrous in places. The rocks of the Turonian White Mountain Formation were found only in boreholes S 1 and S 6 in the western part of the area of interest, they are composed of marlstones and calcareous claystones. Covering formations of Quaternary age are represented by deluvial to deluviofluvial sediments and landfills. Deluvial (deluviofluvial) sediments were formed by displacement of weathered substratum by slow slope movements, with all types of underlying rocks, both Proterozoic shales and Cretaceous sandstones and marlstones, participating in their composition. Practically in the entire area of the area of interest with local, above-described exceptions, the top layer consists of anthropogenic sediments of landfill, which were deposited here during the construction of the existing site and in the western part of the site were probably weighed as tailings deposits. According to the documentation of the probes performed, their composition is absolutely heterogeneous. The thickness of the weigh-ins on most of the area of interest is 1.50-4.00 m.

Radon risk

According to the radon risk map from the geological bedrock available on the CGS web application, the Trnávka project area is located in an area with a low category of radon index from the geological bedrock.

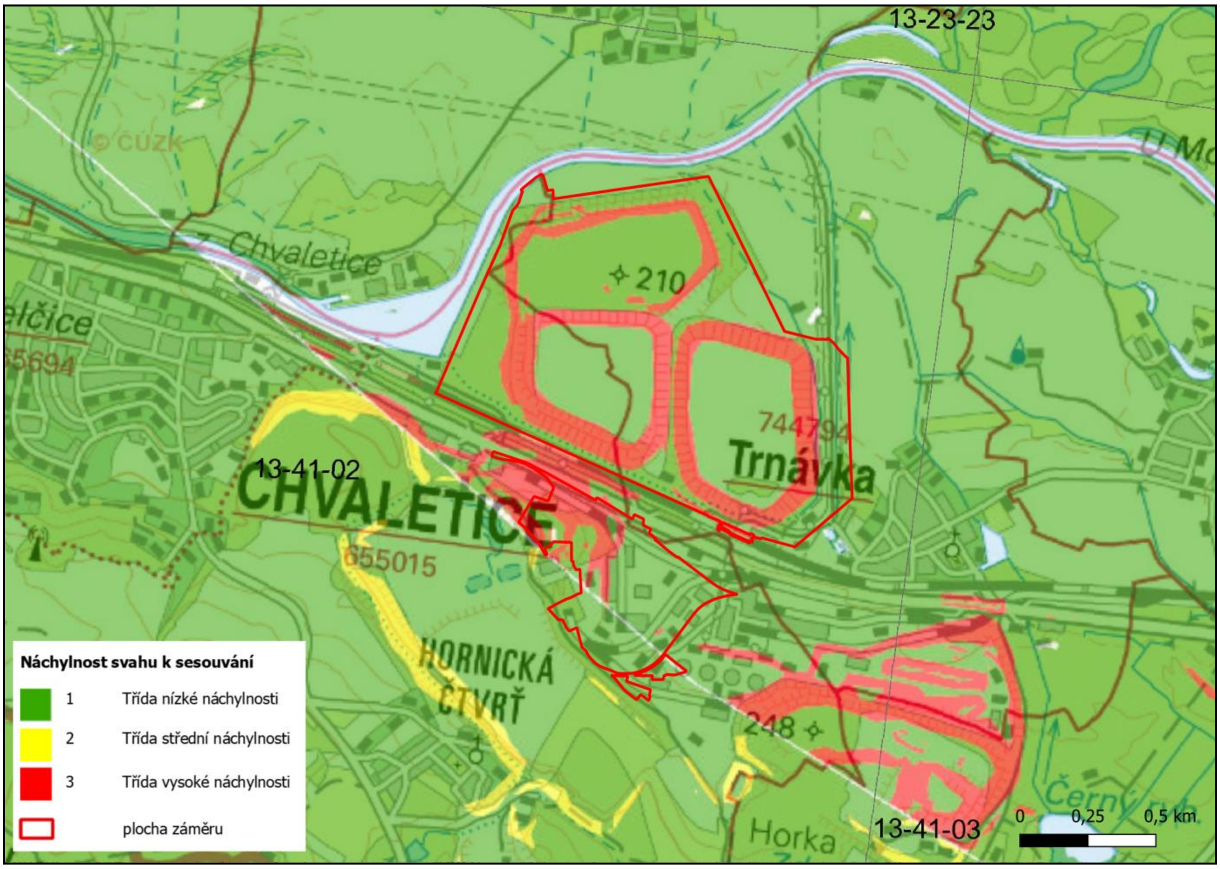
Picture no. 88: Distribution of radon risk in the vicinity of the project (CGS, 2022)



Slope instabilities

According to the CGS map server, there are no point landslides directly in the area of interest. However, the slopes of individual depots are classified as slopes prone to sliding class 3 – High susceptibility class.

Picture no. 89: Localization of the project according to the map of slope instability (CGS, 2022)



Mineral deposits and their protection and use

The Raw Material Information System (SurIS) of the Czech Geological Survey collects and provides in a comprehensive form available data on mineral potential in the Czech Republic.

According to the SURIS ČGS map application, the area of interest of the mine area is located in the protected deposit area of Trnávka (ID: 10480400), where the area of interest consists of two deposits of raw materials, namely the manganese ore deposit Chvaletice-tailings ponds 1,2 (ID: 3104804) and the manganese ore deposit Řečany-odkaliště 3 (ID: 3243700). The area of the processing plant is partially affected by the CHLÚ Chvaletice III. (ID: 104800200). A list of individual SURIS sites encroaching on the project area is given in the table below.

Exclusive deposits of building stone are used:

- deposit Chvaletice, organization GRANITA s.r.o., mining area Chvaletice I
- deposit Zdechovice-Strážník, organization KAMENOLOMY ČR s.r.o., mining area Zdechovice

There are also two exploration areas in the area of the project, namely the Trnávka AO (ID: 140014) and Trnávka II (ID: 180006).

There are several exclusive deposits and deposits of non-reserved minerals, cancelled deposits and prognostic resources.

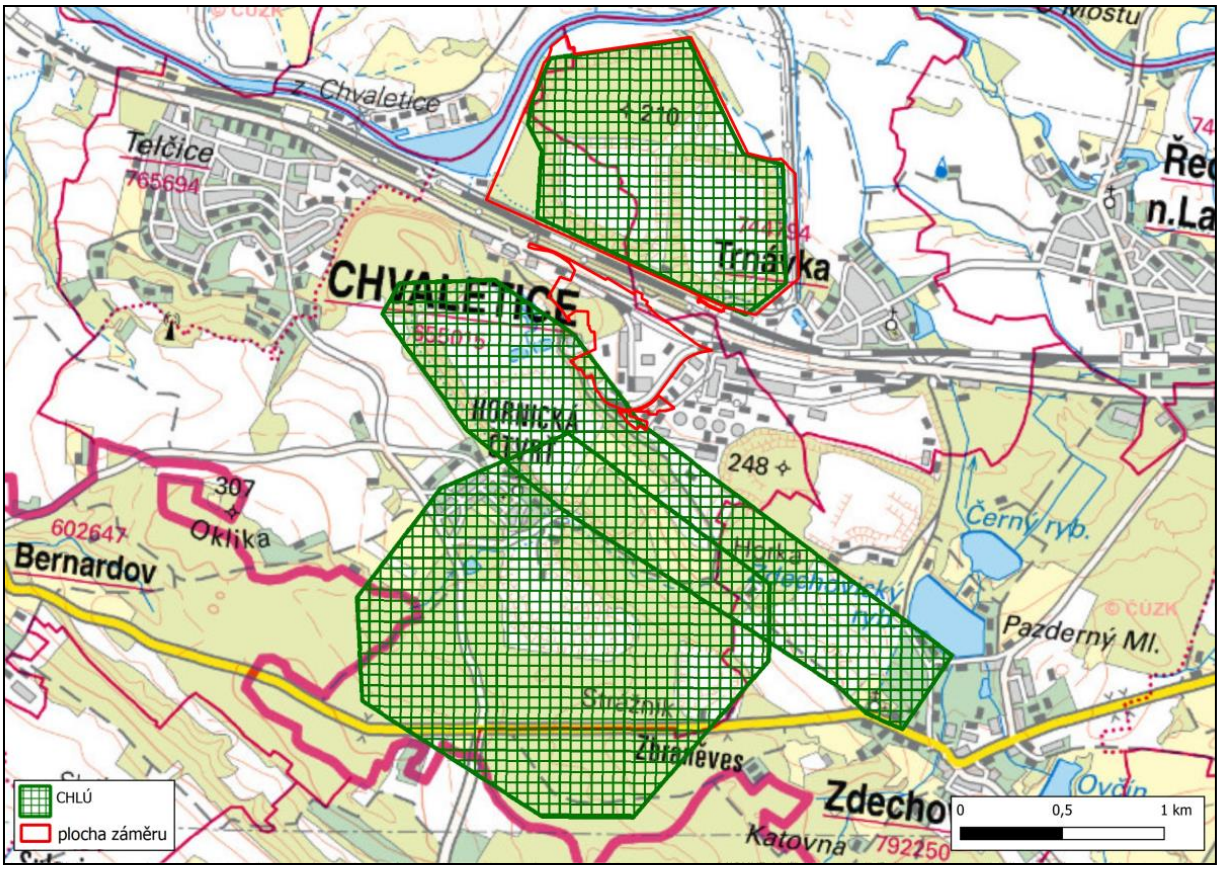
Table No. 86: List of SURIS sites encroaching on the project area

Protected deposit areas		
ID	*Title*	*Raw material*
10480400	Trnávka	Manganese ore
10480200	Chvaletice III.	Iron ores, Manganese ore, Pyrite

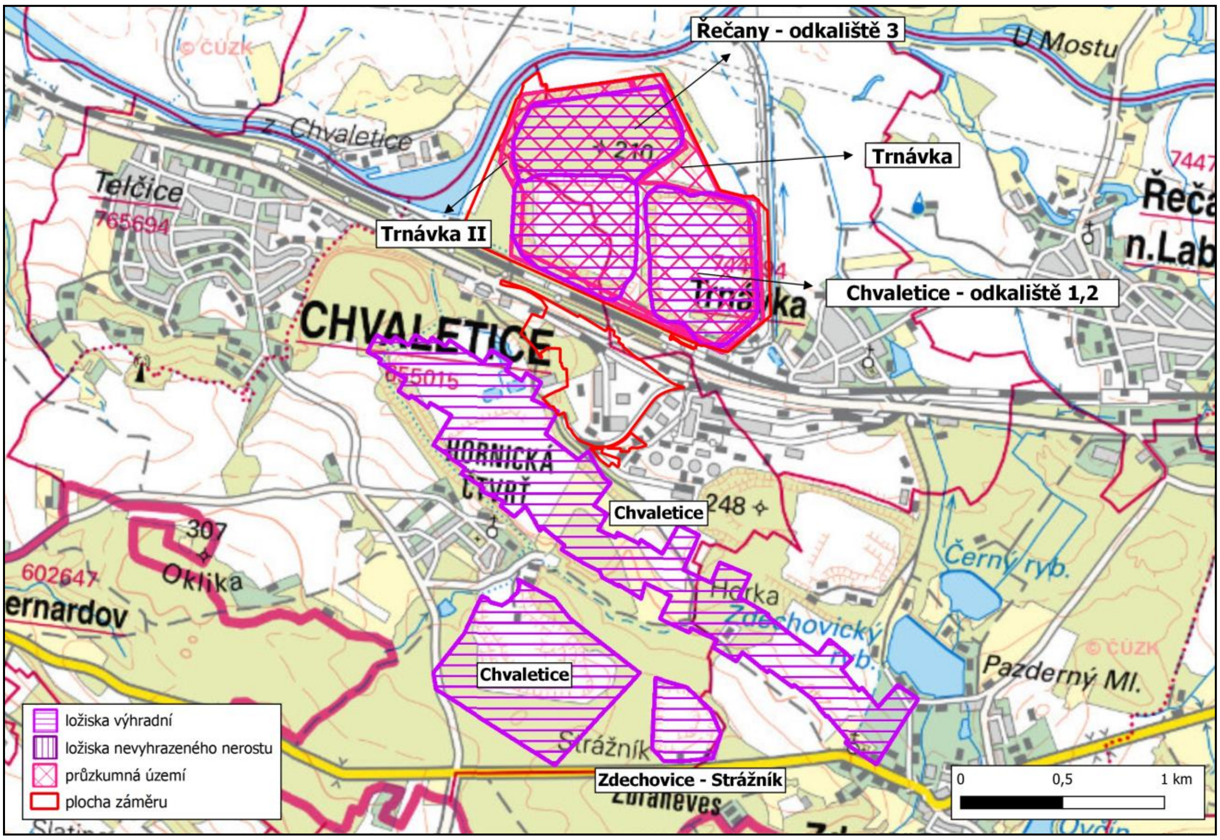
Exclusive deposits			
ID	*Title*	*Raw material*	*Organization*
3104804	Chvaletice - tailings ponds 1,2	Manganese ore	MANGAN Chvaletice, s.r.o.
3243700	Řečany-odododiště 3	Manganese ore	MANGAN Chvaletice, s.r.o.

Exploration areas							
ID	*Title*	*Raw material*	*Emergence of the state*	*End*	*Extension*	*ID*	*Applicant*
140014	Trnávka	Manganese ore	25.09.2014	30.09.2019	31.05.2023	49702904	GET s.r.o.
180006	Trnávka II	Manganese ore	23.05.2018	31.05.2023		25327542	MANGAN Chvaletice, s.r.o.

Picture no. 90: Protected deposit areas in the vicinity of the project (CGS, 2022)



Picture No. 91: SURIS sites in the vicinity of the project (CGS, 2022)



5. *Biodiversity*

Fauna and flora

A biological assessment of the project was prepared for the biota impact assessment (, Annex 5). The survey of the territory was focused on determining the current biological state of the site and the occurrence of specially protected species of plants and animals, listed in the Decree of the Ministry of the Environment No. 395/1992 Coll., as amended to Act No. 114/1992 Coll., on Nature and Landscape Protection, as amended, and other species of conservation importance. (Véle, 2022)

The biological survey shows that the following biotopes are found in the territory:

Table No. 87: List of habitats in the project area

Habitat code	Biotope
K3	High mesophilic and xerophilous shrubs
T1.1	Mesophilic oat meadows and highly influenced biotopes by humans
X2	Intensively farmed fields
X3	Extensively farmed fields
X5	Intensively farmed meadows
X7A	Ruderal herbaceous vegetation outside settlements, stands of conservation importance
X7B	Ruderal herbaceous vegetation outside settlements, other stands
X9B	Forest crops with non-native deciduous trees
X12B	Raids of pioneer trees, other stands
X13	Non-forest tree plantings outside settlements
x14	Watercourses and reservoirs without vegetation of conservation importance

During the surveys, the presence of syntaxons *Arrhenatherion elatioris,* Berberidion vulgaris, Phragmitetum communis *variant* Urtica dioica *was detected.*

The results of both the botanical and zoological surveys were found during the fieldwork that took place from June to October 2016, from March to August 2017, from March to October 2019 and their updates carried out in 2021 and 2022. In addition to the actual data obtained during the survey, literary data about the locality were also used, data from the study Janda, P., 2019: Biological surveys and assessment of the site for the Recycling of the Chvaletice-Trnávka tailings project, and data from the Finding Database of Nature Protection.

For conservationally important plant species and selected invertebrate taxa, the tables show the category of protection according to Decree No. 395/1992 Coll. (O – endangered species, SO – highly endangered species, KO – critically endangered species) and according to the Red List (NT – almost endangered, LC – little affected, C2 – highly endangered, C3 – endangered, C4a- rarer taxon requiring further attention - less endangered, C4b- rarer taxon requiring further attention – insufficiently studied, CR – critically endangered, EN – endangered, VU – vulnerable, NT – near threatened).

O – Endangered species

A species of plant or animal that is endangered or rare, scientifically, or culturally very important and according to Decree No. 395/1992 Coll. classified as an endangered species.

SO – highly endangered species

A species of plant or animal that is endangered or rare, scientifically, or culturally very important and according to Decree No. 395/1992 Coll. classified as a highly endangered species.

KO – critically endangered species

A species of plant or animal that is endangered or rare, scientifically, or culturally very important and according to Decree No. 395/1992 Coll. classified as a critically endangered species.

C1 – critically endangered vascular plant taxa of the Czech Republic

Very rare and endangered taxa with occurrence limited to one or a few local populations are considered critically endangered. Their numbers are less than 10% of their previous representation. Without effective protection, these taxa would most likely soon disappear from the flora of the Czech Republic.

C2 – highly endangered vascular plant taxa of the Czech Republic

Plants with demonstrable and permanent decline are considered to be highly endangered, their status has decreased to 50% of the original representation. They are not in danger of current disappearance, but without proper protection they can get into a state of critical danger.

C3 – endangered vascular plant taxa of the Czech Republic

These are plants with a weaker, but persistent retreat. The reduction in their incidence is between 50 and 80% of the original representation.

C4 - rarer taxa of vascular plants in the Czech Republic requiring further attention

This group includes vascular plant species and subspecies requiring further attention as they can be expected to be endangered in the short term (C4a). At the same time, this category also includes insufficiently studied taxa for which it is not yet possible to determine the degree of threat (C4b).

Critically Endangered (CR)

A taxon is critically endangered if the best available evidence indicates that it meets any of the criteria A through E for critically endangered taxa and is therefore considered to face an extremely high risk of extinction in the wild.

Endangered (EN)

A taxon is endangered if the best available facts indicate that it meets any of the criteria A through E for endangered taxa and is therefore considered to face a very high risk of extinction in the wild.

Vulnerable (VU)

A taxon is vulnerable if the best available evidence indicates that it meets any of the criteria A to E for vulnerable taxa (see Part V) and is therefore considered to be at great risk of extinction in the wild.

Near Threatened (NT)

A taxon is near threatened if it has been assessed against these criteria and is not currently classified as 'critically endangered', 'endangered' or 'vulnerable', but it almost meets those criteria or is likely to meet them in the near future.

Flora of the area of interest

During the survey, the presence of 335 plant taxa was detected. The only specially protected species found is the red yew. These are individuals originating from artificial planting. The Red List of Plants of the Czech Republic includes Blitum bonus-henricus (C4a), Carex Curvata (C3), Silene Baccifera (C3) and Filago arvensis (C3), Filago minima (C3), Epipactis helleborine (C4a), Euphorbia waldsteinii (C4a), Centaurium erythraea (C4a), Inula salicina (C4a).

The following table provides an overview of all plant species found in the entire area of the project, i.e. in the area of mining and processing plant.

Table No. 88: List of plant taxa found

Latin name	**English name**	**Protection**
Acer campestre	Field maple	
Acer negundo	Ash maple	
Acer platanoides	Norway maple	
Acer pseudoplatanus	sycamore maple	
Aegopodium podagraria	ground elder	
Aesculus hippocastanum	horse chestnut	
Agrostis capillaris	colonial bent	
Agrostis stolonifera	creeping bentgrass	
Achillea millefolium	milfoil	
Ailanthus altissima	tree of heaven	
Alchemilla sp.	Lady´s Mantle	
Alliaria petiolate	garlic mustard	
Allium oleraceum	wild garlic	
Allium scorodoprasum	rocambole	
Alnus glutinosa	common alder	
Alopecurus pratensis	meadow foxtail[	
Amaranthus retroflexus	red-root amaranth	
Amaranthus retroflexus	red-root amaranth	
Amorpha fruticose	Desert false indigo	
Anagallis arvensis	scarlet pimpernel	
Anthemis arvensis	corn chamomile	
Anthoxanthum odoratum	sweet vernal grass	
Anthriscus nitidus		
Arabidopsis thaliana	thale cress	
Arctium lappa	greater burdock	
Arctium minus	lesser burdock	
Arctium tomentosum	woolly burdock	
Arrhenatherum elatius	bulbous oat grass	
Artemisia vulgaris	mugwort	
Astragalus glycyphyllos	liquorice milkvetch	
Avenella flexuosa	wavy hair-grass	
Ballota nigra	black horehound	
Bellis perennis	Daisy	

Latin name	English name	Protection
Betula pendula	silver birch	
Blitum bonus-henricus	Good-King-Henry	C4a
Bromus hordeaceus	Soft brome	
Bromus sterilis	barren brome	
Bromus tectorum	cheatgrass	
Bupleurum falcatum	cheatgrass sickle-leaved hare's-ear	
Caduus acanthoides	plumeless thistle	
Calamagrostis epigejos	wood small-reed	
Calystegia sepium	hedge bindweed	
Campanula patula	spreading bellflower	
Campanula persicifolia	peach-leaved bellflower	
Capsella bursa pastoris	shepherd's purse	
Cardaria draba	hoary cress	
Carduus pratensis		
Carex brizoides	quaking sedge	
Carex contigua		
Carex curvata		C3
Carex hirta	hairy sedge	
Carex muricata	rough sedge	
Carlina vulgaris	carline thistle	
Centaurea jacea	brown knapweed	
Centaurea stoebe	spotted knapweed	
Centaurium erythraea	common centaury	C4a
Cerastium arvense	field mouse-ear	
Cerastium holosteoides	common mouse-ear chickweed	
Cichorium intybus	Common chicory	
Cirsium arvense	Canada thistle	
Cladophora glomerata		
Clinopodium vulgare	wild basil	
Convolvulus arvensis	field bindweed	
Conyza canadensis	Canadian horseweed	
Cornus sanguinea	common dogwood	
Corylus avellana	common hazel	
Cotoneaster dammeri	bearberry cotoneaster	
Crataegus monogyna	common hawthorn	
Crataegus sp.	littlehip hawthorn	
Crepis biennis	rough hawksbeard	
Cytisus scoparius	common broom	
Dactylis glomerata	orchard grass	
Daucus carota	wild carrot	
Dianthus carthusianorum	Carthusian pink	
Digitalis purpurea	foxglove	

Latin name	English name	Protection
Digitaria sanguinalis	hairy crabgrass	
Dipsacus fullonum	wild teasel	
Draba verna	common whitlowgrass	
Dryopteris filix-mas	male fern	
Echinochloa crus-galli	cockspur grass	
Echinops exaltatus	Russian globe thistle	
Echinops sphaerocephalus	glandular globe-thistle	
Echium vulgare	viper's bugloss	
Elymus caninus	bearded couch	
Elytrigia repens		
Epilobium angustifolium		
Epilobium ciliatum	fringed willowherb	
Epilobium hirsutum	great willowherb	
Epilobium parviflorum	hoary willowherb	
Epilobium tetragonum	square stalked willow herb	
Epipactis helleborine	broad-leaved helleborine	C4a
Equisetum arvense	field horsetail	
Erigeron acris	bitter fleabane	
Erigeron annuus	annual fleabane	
Erodium cicutarium	common stork's-bill	
Erysimum odoratum		
Euonymus europaeus	European spindle	
Eupatorium cannabinum	hemp-agrimony	
Euphorbia cyparissias	cypress spurge	
Euphorbia waldsteinii		C4a
Fallopia convolvulus	black-bindweed	
Festuca ovina	sheep's fescue	
Festuca pratensis	meadow fescue	
Festuca rubra	red fescue	
Filago arvensis		C3
Filago minima		C3
Filipendula ulmaria	meadowsweet	
Fragaria officinalis		
Fraxinus excelsior	European ash	
Fraxinus ornus	manna ash	
Galeopsis speciosa	large-flowered hemp-nettle	
Galeopsis terahit	common hemp-nettle	
Galinsoga parviflora	potato weed	
Galium album	white bedstraw	
Galium aparine	Cleavers	
Galium mollugo	hedge bedstraw	
Galium sylvaticum	Scotch mist	
Galium verum	lady's bedstraw	

Latin name	English name	Protection
Germanic genist		
Geranim pyreneicum	hedgerow cranesbill	
Geranium pratensis	meadow crane's-bill	
Geranium pusilum	small-flowered crane's-bill	
Geranium robertianum	herb-Robert	
Geum urbanum	wood avens	
Gnaphalium sylvaticum	heath cudweed	
Heracleum spondylium	hogweed	
Hieracium bauhini		
Hieracium pilosella	mouse-ear hawkweed	
Hieracium piloselloides	tall hawkweed	
Hieracium sp.		
Hollcus lanatus	Yorkshire fog	
Humulus lupulus	common hop	
Hypericum perforatum	St John's wort	
Hypochaeris radicata	catsear	
Chaerophyllum temulum	rough chervil	
Chelidonium majus	greater celandine	
Chenopodium album	lamb's quarters	
Chrysanthemum leucanthemum		
Impatiens glandulifera	Himalayan balsam	
Impatiens noli-tangere	touch-me-not balsam	
Impatiens parviflora	small balsam	
Inula conyzae		
Inula salicin		C4a
Juglans directed		
Juncus conglomeratus		
Juncus effusus	common rush	
Juncus tenuis	path rush	
Juniperus x media		
Knautia arvensis	field scabious	
Lactuca muralis		
Lactuca seriola	prickly lettuce	
Lamium albums	white nettle	
Lamium amplexicaule	common henbit	
Lamium purpureum	red dead-nettle	
Larix decidua	European larch	
Lathyrus pratensis	meadow vetchling	
Lathyrus sylvestris	flat pea	
Lathyrus tuberosus	tuberous pea	
Lavatera thuringiaca	garden tree-mallow	
Lemna minor	common duckweed	
Leontodon autumnalis	autumn hawkbit	

Latin name	English name	Protection
Leucanthemum ircutianum	oxeye daisy	
Libanotis pyrenaica		
Ligustrum vulgare	wild privet	
Linaria vulgaris		
Lithospermum arvensis		
Lolium perennial		
Lonicera xylosteum	fly honeysuckle	
Lotus corniculatus	common bird's-foot trefoil	
Luzula luzuloides	white wood-rush	
Luzula multiflora	common woodrush	
Lychnis flos-cuckoos		
Lysimachia vulgaris	yellow loosestrife	
Lythrum salicaria	purple loosestrife	
Mahonia aquifolium		
Malus sp.	nokaidō	
Malva sylvestris	common mallow	
Matricaria recutita	chamomile	
Medicago lupulina	black medick	
Medicago sativa	lucerne	
Melandrium album	white campion	
Melilotus albus	honey clover	
Melilotus officinalis	sweet yellow clover	
Microrrhinum minus		
Microthlaspi perfoliatum		
Milium effusum	American milletgrass	
Mycelis muralis	wall lettuce	
Myosotis arvensis	field forget-me-not	
Myosoton aquaticum	water chickweed	
Oenothera biennis	common evening-primrose	
Origanum vulgare	Oregano	
Oxalis latifolia	garden pink-sorrel	
Papaver rhoeas	common poppy	
Papaver rhoeas		
Pastinaca sativa	parsnip	
Persicaria lapathifolia	pale persicaria	
Petrorhagia proliferates		
Peucedanum cervaria		
Phalaris arundinacea	reed canary grass	
Philadelphus coronarius	English dogwood	
Phleum pratense	Timothy	
Phragmites australis	common reed	
Picea abies	Norway spruce	
Picea pungens	blue spruce	

Latin name	**English name**	**Protection**
Pimpinella saxifraga	burnet-saxifrage	
Pinus mugo	dwarf mountain pine,	
Pinus nigra	Austrian pine	
Pinus strobus	eastern white pine	
Pinus sylvestris	Scots pine	
Plantago lanceolata	ribwort plantain	
Plantago major	broadleaf plantain	
Plantago media	hoary plantain	
Poa angustifolia		
Poa annua	annual meadow grass	
Poa compressa	Canada bluegrass	
Poa nemoralis	wood bluegrass	
Poa palustris	fowl bluegrass	
Poa vulgare		
Polygonum arenastrum	equal-leaved knotgrass	
Polygonum aviculare	common knotgrass	
Populus alba	silver poplar	
Populus canadensis		
Populus nigra	black poplar	
Populus tremula	common aspen	
Portulaca oleracea	common purslane	
Potentilla anserina	silverweed	
Potentilla argentea	hoary cinquefoil	
Potentilla erecta	Common tormentil	
Potentilla heptaphylla		
Potentilla intermedia		
Potentilla reptans	creeping cinquefoil	
Prenanthes purpurea	rattlesnake root	
Prunella vulgaris	common self-heal	
Prunus avium	wild cherry	
Prunus cerasifera	cherry plum	
Prunus insititia		
Prunus mahaleb	mahaleb cherry	
Prunus spinosa	blackthorn	
Pseudotsuga menziesii	Douglas spruce	
Pyrus pyraster	European wild pear	
Quercus cerris	Turkey oak	
Quercus palustris	pin oak	
Quercus robur	pedunculate oak	
Quercus rubra	northern red oak	
Ranunculus acris	meadow buttercup	
Reynoutria japonica	Japanese knotweed	
Robinia pseudoacacia	black locust	

Latin name	English name	Protection
Dog pink		
Rosa dumalis	glaucous dog rose	
Rubus caesius	European dewberry	
Rubus fruticosus agg.		
Rubus sp.		
Rumex acetosa	common sorrel	
Rumex acetosella	red sorrel	
Rumex crispus	curly dock	
Rumex obtusifolius	bitter dock	
Rumex thyrsiflorus	compact dock	
Salix × sepulcralis	white weeping willow	
Salix albums		
Salix caprea	goat willow	
Salix fragilis		
Salvia pratensis	meadow clary	
Sambucus nigra	elderberry	
Sanguisorba minor	salad burnet	
Sanguisorba officinalis	great burnet	
Saponaria officinalis	common soapwort	
Scrophularia nodosa	woodland figwort	
Securigera varia	crownvetch	
Sedum acre	goldmoss stonecrop	
Sedum album	white stonecrop	
Senecio jacobaea	ragwort	
Senecio ovatus	wood ragwort	
Senecio viscosus	sticky ragwort	
Senecio vulgaris	groundsel	
Setaria pumila	yellow foxtail	
Setaria viridis	green foxtail	
Silene baccifera		C3
Silene dioica	red campion	
Silene latifolia subsp. alba	white campion	
Silene nutans	Nottingham catchfly	
Silene vulgaris	bladder campion	
Sinapis arvensis	charlock mustard	
Sisymbrium loeselii	small tumbleweed mustard	
Solanum nigrum	European black nightshade	
Solidago canadensis	Canada goldenrod	
Solidago gigantea	tall goldenrod	
Solidago virgaurea		
Sonchus oleraceus	common sowthistle	
Sorbus aucuparia	rowan	
Spiraea × vanhouttei		

Latin name	English name	Protection
Stachys sylvatica	hedge woundwort	
Medium stellaria		
Symphytum officinale	comfrey	
Syringa vulgaris	common lilac	
Tanacetum vulgare	common tansy	
Taraxacum sect. ruderaria		
Taxus baccata	yew	§SAT
Thlaspi arvense	field pennycress	
Thymus serpyllum	Breckland thyme	
Tilia cordata	small-leaved lime	
Tilia euchlora		
Tilia platyphyllos	large-leaved lime	
Torilis japonica	erect hedgeparsley	
Tragopogon dubium		
Tragopogon orientalis	Oriental goat's beard	
Tragopogon pratensis	Jack-go-to-bed-at-noon	
Trifolium arvense	hare's-foot clover	
Trifolium aureum	large hop trefoil	
Trifolium campestre	hop trefoil	
Trifolium dubium	lesser trefoil	
Trifolium pratense	red clover	
Trifolium repens	white clover	
Tripleurospermum inodorum	scentless false mayweed	
Tussilago farfara	coltsfoot	
Ulmus glabra	wych elm	
Ulmus laevis	European white elm	
Urtica dioica	common nettle	
Valeriana officinalis	Valerian	
Verbascum densiflorum	denseflower mullein	
Verbascum nigrum	black mullein	
Verbascum thapsus	great mullein	
Veronica arvensis	wall speedwell	
Veronica chamaedrys	germander speedwell	
Veronica officinalis	heath speedwell	
Veronica serpyllifolia	thyme-leaved speedwell	
Viccia sativa	common vetch	
Vicia angustifolia		
Vicia cracca	tufted vetch	
Vicia hirsuta	hairy tare	
Vicia sepium	bush vetch	
Vicia tetrasperma	smooth tare	
Vinca minor	lesser periwinkle	
Viola arvensis	field pansy	

Fauna of the area of interest

As part of the biological assessment (Véle, 2022 – Annex No. 5), a zoological survey of the site was also carried out.

Invertebrates

The presence of invertebrates was detected by individual collection, ground traps, white bowls, laying of food baits and sweeping of vegetation.

When surveying invertebrates, 7 species were recorded, which are listed in the Red List. Two species are critically endangered (CR), one species is endangered (EN) and four species are vulnerable (VU).

The most important find is *Hedychridium krajniki*, which occurs only in very good sandy and loess localities. Other gerbil bioindicator species listed in the Red List *Crossocerus wesmaeli* and *Tachysphex obscuripennis, Hedychrum nobile* and *Priocnemis minuta* were found at the site. Other gerbil-loving species worth mentioning *include Crossocerus exiguus, Nysson trimaculatus* and *Lasioglossum politum*.

Very significant was the discovery of a rare black mud daubers *Pemphredon austriaca*, which is very rarely collected, perhaps even overlooked because of the hidden way of life. This species probably nests only in the oak gills.

Among the bees included in the Red List, only the species *Epeolus variegatus* was recorded at the site. Tailings are important especially in terms of the occurrence of goldfinches, rakes and handymen. They are not so important for bees, because there are not as many plants that bees are specialized in, as is the case in natural sandy biotopes.

Of the specially protected invertebrates, the occurrence of ants of the genus *Formica*, bumblebees of the genus *Bombus* and the black flower chafer have been confirmed in the area.

a) *Aquatic invertebrates*

The littoral zone of the Elbe in the examined section is completely modified by stone levelling. Due to this, it provides a minimum of habitats for aquatic organisms. Overall, the community of aquatic organisms is very poor. Only dragonflies were more represented. A total of 8 species have been recorded: Glossy butterfly *(Calopteryx splendens*), greater broadleaf (Ischnura elegans*), broad-legged broad-legged (Platycnemis pennipes*), black-breasted dragonfly *(Orthetrum cancellatum*), variegated awlgrass *(Aeschna mixta), copper shiner (*Cordulia aenea*), red shiner (*Pyrrhosoma nymphula*), red-eyed broad-leaved* (*Erythromma najas*). In all cases, these are common species.

Of the specially protected species, due to the nature of the locality, the species *Unio pictorum* and the yellow-legged wedge (*Gomphus Flavius*) can be found. However, these species were not detected during the basic survey.

In 2020, the revitalization carried out fundamentally changed the character of the blind arm, which is now flooded with sufficient water depth. In the coming years, an increase in the abundance and species diversity of aquatic invertebrates can be expected. Littoral parts can also be used, for example, for amphibian reproduction. Part of the mature trees growing along the banks of the arm was preserved, part was felled and left in the place where they serve for the development of insects. The retained trees were supplemented by planting young trees of suitable species composition. Despite the fact that some of them withered during the first years, it is a suitable measure to support biodiversity in the area.

In 2021 and 2022, no updates of hydrobiological surveys were carried out, the plan will not affect the sites that were the subject of these surveys.

b) *Hymenoptera*

Within the framework of the survey of selected groups of Hymenoptera squidge beetles at the site of the former tailings of the Chvaletice power plant, 51 species from 13 families were found: *Chrysididae*, *Vespidae*, Pompilidae, Tiphiidae, Mutillidae, Sapygidae, *Ampulicidae, Pompilidae*, Tiphiidae, *Mutillidae*, Ampulicidae, *Ampulicidae* (*Sphecidae*), *Crabronidae, Colletidae,* Halictidae, *Megachilidae*, Apidae.

Of the important species found at the site, these were mainly bioindicator species of drift sands.

Vertebrates

The presence of vertebrates was recorded using short-term traps, visually, acoustically, by means of residence signs, camera traps and a bat detector. Flying bird species were also recorded.

The survey confirmed the occurrence of 76 vertebrate species: 6 species of amphibians, 3 species of reptiles, 51 species of birds and 16 species of mammals. **Twenty recorded vertebrates are among the species specially protected.**

Table No. 89: List of vertebrate species found

	Latin name	Czech name	Protection
Amphibians	*Bufo bufo*	ropucha obecná	§O
	Bufotes viridis	ropucha zelená	§SAT
	Pelophylax esculentus	skokan zelený	§SAT
	Early Dalmatian	skokan štíhlý	§SAT
	Rana temporaria	skokan hnědý	
	Lissotriton vulgaris	čolek obecný	§SAT
Reptiles	*Anguis fragilis*	slepýš křehký	§SAT
	Lacerta agilis	ještěrka obecná	§SAT
	Natrix natrix	užovka obojková	§O
Birds	*Alauda arvensis*	skřivan polní	
	Ardea cinerea	volavka popelavá	
	Buteo buteo	káně lesní	
	Carduelis cannabina	konopka obecná	
	Carduelis carduelis	stehlík obecný	
	Carduelis chloris	zvonek zelený	
	Columba livia	holub skalní	
	Columba palumbus	holub hřivnáč	
	Corvus corax	krkavec velký	§O
	Coturnix coturnix	křepelka polní	§SAT

	Latin name	Czech name	Protection
	Cuculus canorus	kukačka obecná	
	Cyanistes caeruleus	sýkora modřinka	
	Delichon urbica	jiřička obecná	
	Dendrocopos major	strakapoud velký	
	Dryocopus martius	datel černý	
	Emberiza calandra	strnad luční	§KO
	Emberiza citronella	strnad obecný	
	Erithacus rubecula	červenka obecná	
	Falco tinnunculus	poštolka obecná	
	Fringilla coelebs	pěnkava obecná	
	Garrulus glandarius	sojka obecná	
	Hirundo rustica	vlaštovka obecná	§O
	Lanius collurio	ťuhýk obecný	§O
	Larus ridibundus	racek chechtavý	
	Locustella naevia	cvrčilka zelená	
	Luscinia megarhynchos	slavík obecný	O
	Motacilla albums	konipas bílý	
	Oriolus oriolus	žluva hajní	§KO
	Parus major	sýkora koňadra	
	Passer domesticus	vrabec domácí	
	perdix perdix	koroptev polní	§O
	Periparus ater	sýkora uhelníček	
	Phasianus colchicus	bažant obecný	
	Phoenicurus ochruros	rehek domácí	
	Phoenicurus phoenicurus	rehek zahradní	
	Phylloscopus collybita	budníček menší	
	Phylloscopus trochilus	budníček větší	
	Pica pica	straka obecná	
	Picus viridis	žluna zelená	
	Saxicola rubetra	bramborníček hnědý	§O
	Sitta europaea	brhlík lesní	
	Streptopelia decaocto	hrdlička zahradní	
	Sturnus vulgaris	špaček obecný	
	Sylvia atricapilla	pěnice černohlavá	
	Sylvia borin	pěnice slavíková	
	Sylvia communis	pěnice hnědokřídlá	
	Sylvia curruca	pěnice pokřovní	
	Troglodytes troglodytes	střízlík obecný	
	Turdus merula	kos černý	

	Latin name	**Czech name**	**Protection**
	Turdus philomelos	drozd zpěvný	
	Turdus viscivorus	drozd brávník	
Mammals	*Apodemus sp.*	myšice	
	Arvicola terrestris	hryzec vodní	
	Capreolus capreolus	srnec obecný	
	Eptesicus serotinus	netopýr večerní	§SAT
	Erinaceus europaeus	ježek západní	
	Lepus europeaus	zajíc polní	
	Martes sp. z o.o.	kuna	
	Microtus sp.	hraboš	
	Mus musculus	myš domácí	
	Mustela nivalis	lasice kolčava	
	Pipistrellus pipistrellus	netopýr hvízdavý	§SAT
	Sciurus vulgaris	veverka obecná	§O
	Sorex araneus	rejsek obecný	
	Sus scrofa	prase divoké	
	Talpa europaea	krtek obecný	
	Vulpes vulpes	liška obecná	

Specially protected species

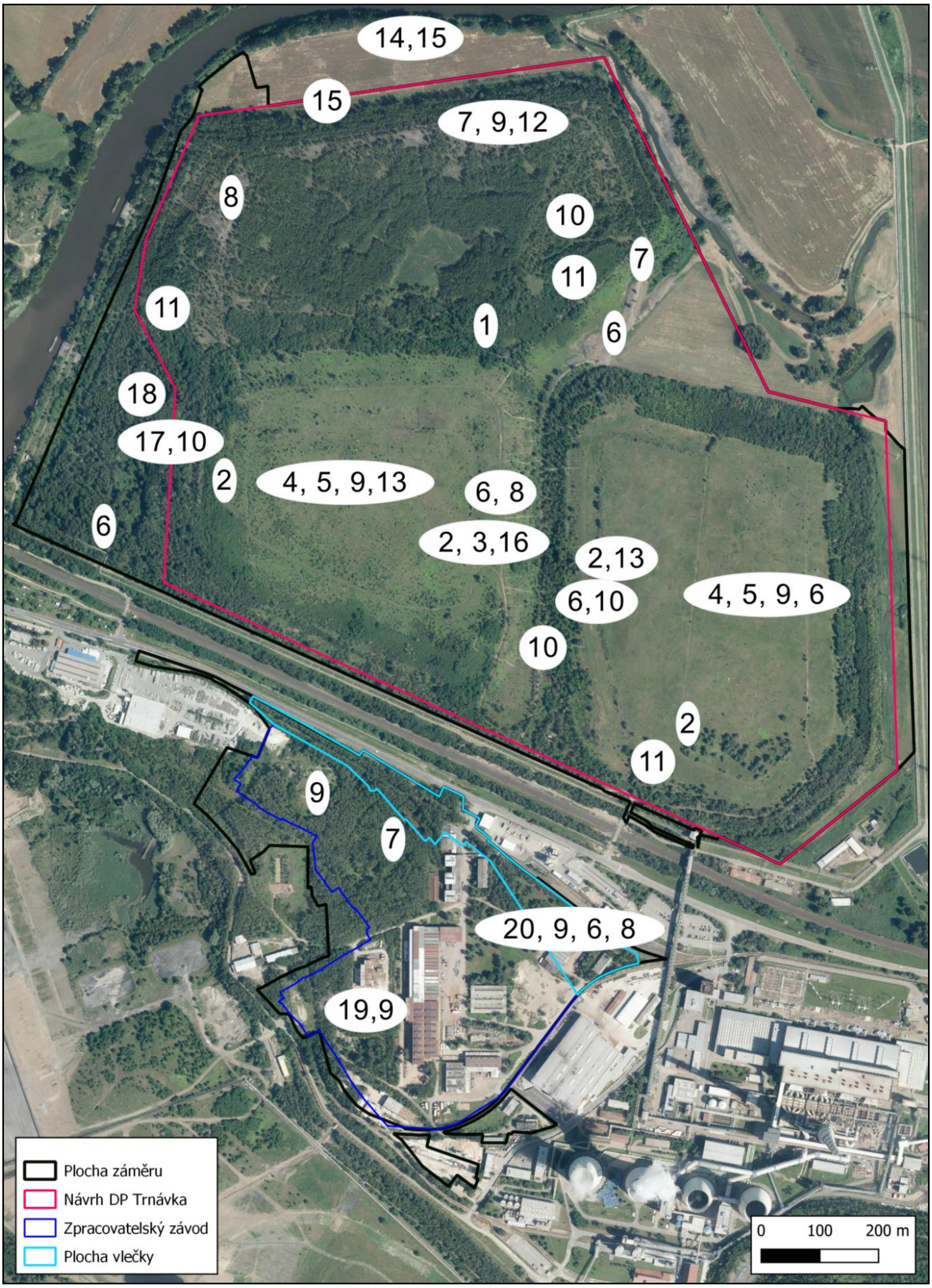
During the inventory surveys, 23 specially protected animal species were found. Their list and categories of protection according to Decree No. 395/1992 Coll. to Act No. 114/1992 Coll. are listed in the table below. The approximate location of specially protected species in the area of interest is shown in the picture (**Chyba! Chybný odkaz na záložku.**).

Table No. 640: List of specially protected taxa found

Latin name	Czech name	Protection
Anguis fragilis	slepýš křehký	§SAT
Bombus sp.	čmelák	§O
Lissotriton vulgaris	čolek obecný	§O
Bufo bufo	ropucha obecná	§ The
Bufotes viridis	ropucha zelená	§SAT
Corvus corax	krkavec velký	§O
Coturnix coturnix	křepelka polní	§SAT
Emberiza calandra	strnad luční	§KO
Formica sp. z o.o.	mravenec	§O
Hirundo rustica	vlaštovka obecná	§O
Lacerta agilis	ještěrka obecná	§SAT
Lanius collurio	ťuhýk obecný	§O
Luscinia megarhynchos	slavík obecný	§O
Pipistrellus pipistrellus	netopýr hvízdavý	§SAT
Eptesicus serotinus	netopýr večerní	§SAT
Natrix natrix	užovka obojková	§O
Oriolus oriolus	žluva hajní	§KO
Oxyhyrea funesta	zlatohlávek tmavý	§O
perdix perdix	koroptev polní	§O
Early Dalmatian	skokan štíhlý	§SAT
Rana esculenta	skokan zelený	§SAT
Saxicola rubetra	bramborníček hnědý	§O
Sciurus vulgaris	veverka obecná	§O

§O – endangered species, §SO – highly endangered species, §KO – critically endangered species

Picture no. 92: Approximate localization of occurrence of specially protected animal species



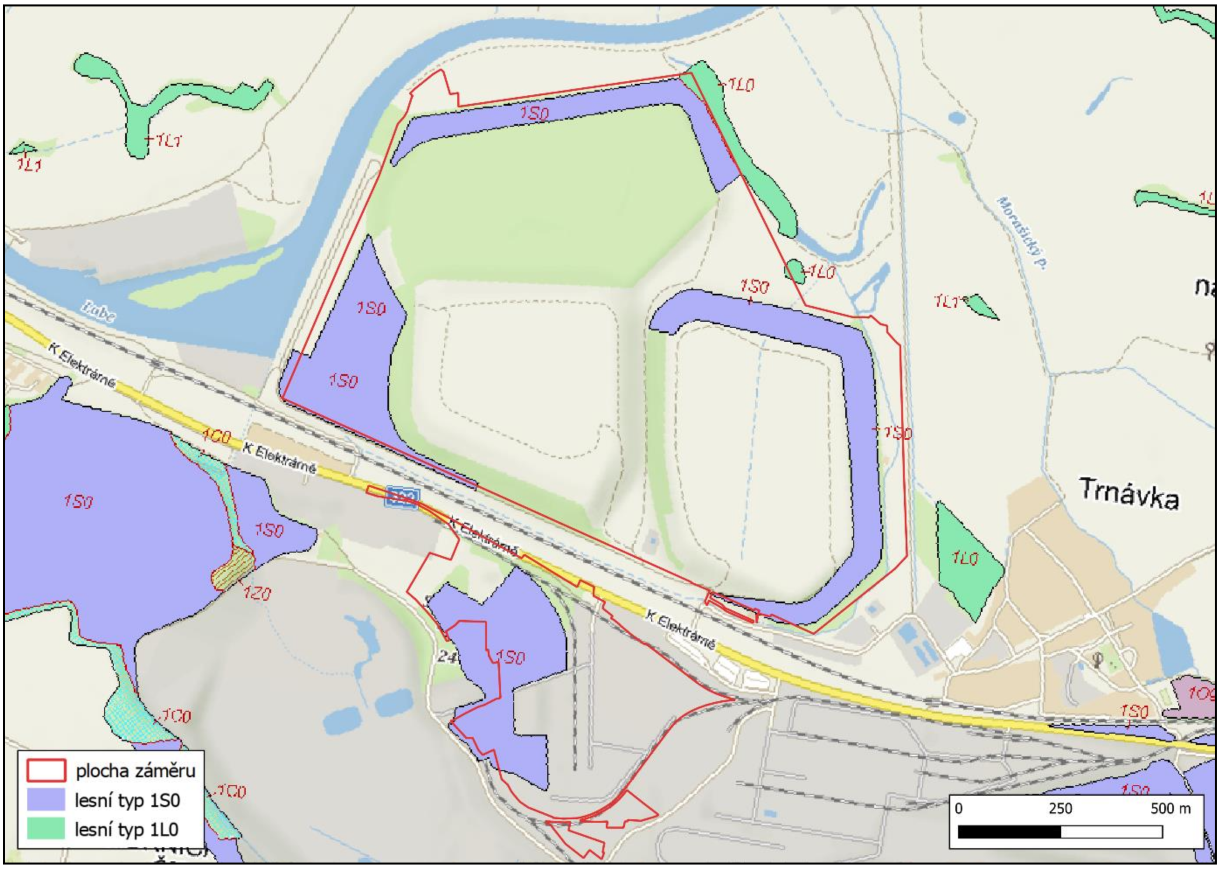
1– Woodpecker, 2 – Red-backed Shrike, 3 – Brown Potato Beetle, 4 – Partridge, 5 – Quail, 6 – Formica sp. ants, 7 – Slowworm, 8 – Common Lizard, 9 – Bumblebees Bombus sp., 10 – Common Toad, 11 – Common Nightingale, 12 – Collared Snake, 13 – Black Flower Chafer, 14 – Green Frog, 15 – Slender Frog, 16 – Meadow Bunting, 17 – Common Squirrel, 18 – Common Newt, 19 – green toad, 20 – red yew, undrawn – bats, swallow, raven.

Forest

On the area of interest there are no land designated to perform forest functions.

However, the map server of the Institute for Forest Management (ÚHUL) defines groups of forest types in part of the areas.

Picture no. 93: Localization of the area of interest according to the map Regional forest development plans (www.uhul.cz, 2022)



According to MS FMI, the area of interest is located in the natural forest area 17 - Polabí, forest vegetation level 1 - oak.

The following groups of forest types are defined in the territory:

- 1S0 - (Hornbeam) oak woods on sands/(Carpineto) Quercetum mesothrophicum (arenosum)
- 1L0 - Jilmový luh / Ulm Quercetum alluviale(-is)

Stands of non-forest tree species

Mining area

The vegetation of non-forest tree species in the mining area was evaluated as part of a dendrological survey (Lišková and Vlachová, 2022, Annex No. 7A). The aim of the fieldwork was to evaluate the present trees in the project area, which lie outside the land designated for forest function (PUPFL).

As part of the survey, all present trees in the area of interest were monitored. Special attention was paid to trees exceeding the trunk circumference of 80 cm (diameter 25.5 cm) at a height of 1.3 m above the ground and continuous shrub stands with an area of over 40 m^2.

The dendrological survey (evaluation of individual parameters) was carried out on the basis of the methodology of the Nature Conservation Agency of the Czech Republic – Valuation of tree species growing outside the forest, including the calculation of compensation measures for felled or damaged tree species (Kolařík et al., 2022). Most of the area of interest was already evaluated in 2017 on the basis of the original AOPK methodology from 2013. This is the area of the proposed Trnávka DP. For the purposes of assessing stands according to the updated methodology from 2022, data from this original survey were used. In addition, fieldwork was carried out in 2022 on areas outside the proposed DP. These are areas adjacent to this DT from the west and south sides and which will be used for the construction of a temporary deposit and for other handling areas. An overview of individual plots on which the dendrological survey was carried out is given in the following paragraphs.

Plots where the survey was carried out in the area of the proposed Trnávka DP:

- Chvaletice No. 1170/1, 1170/7, 1170/8, 1170/4, 1175/2, 1180/12, 1180/13, 1180/5, 1180/18, 1180/10, 1180/9, 1180/36, 1180/4, 1180/3, 1180/30, 1180/27, 1180/31, 1180/38, 1180/34, 1180/39, 1180/28, 1180/29, 1180/32, 1180/33, 1180/40, 1180/42, 1180/2, 1180/41.
- Trnávka No. 481/19, 481/4, 481/2, 1058/16, 460/1, 1049, 1050, 349/2, 662/1, 613/4, 613/5, 995/24, 1058/11, 481/1, 481/3, 1065, 613/1, 613/7, 613/6, 613/9, 613/8, 1011, 1013, 1014/1, 1014/2, 995/6, 666/2, 666/4.

Plots where the survey was carried out in adjacent areas outside the proposed Trnávka DP:

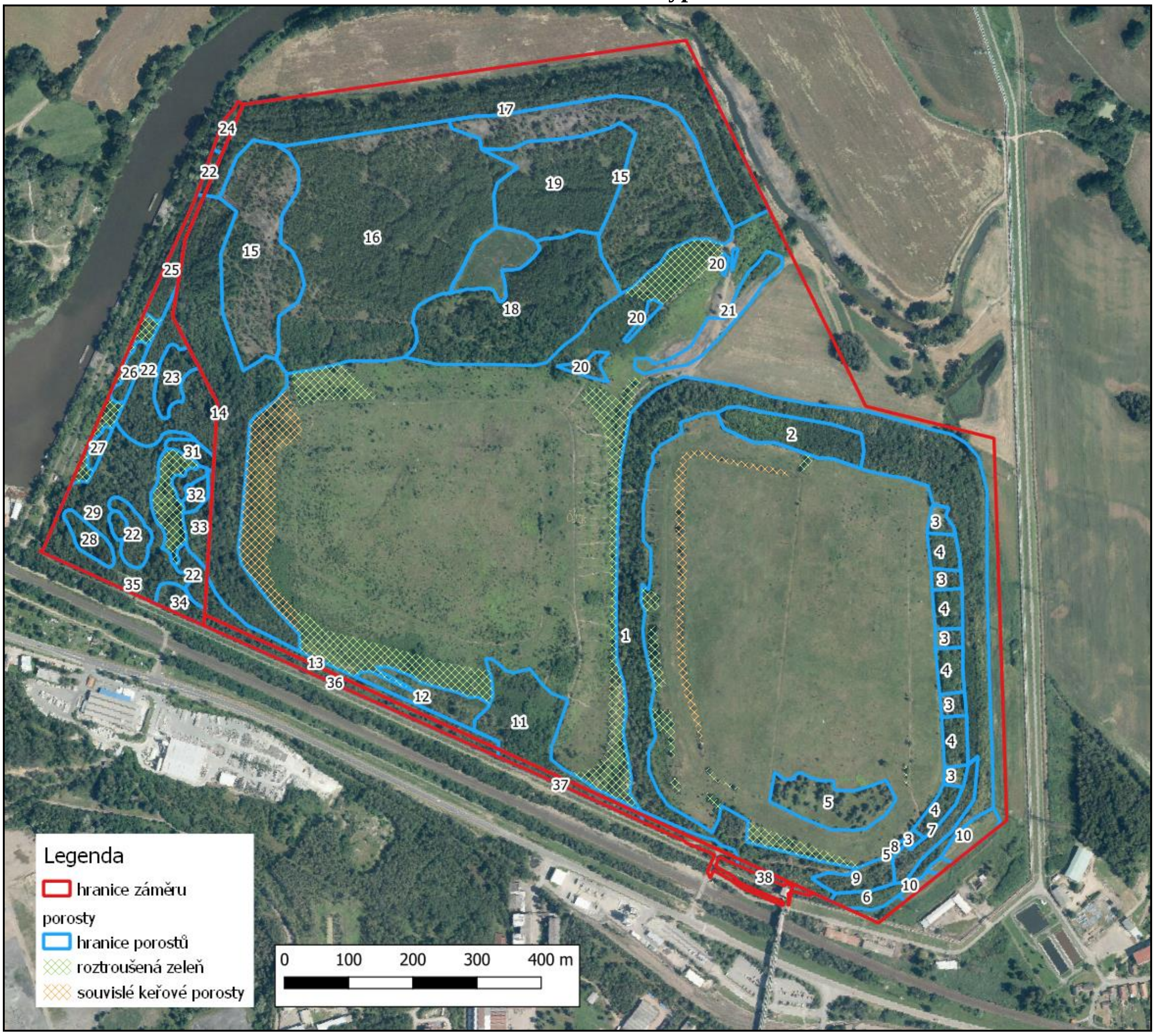
- Trnávka cad. No. 481/2, 481/1, 481/4, 481/8, 481/13, 481/18, 613/4, 613/8, 613/3, 613/5.
- in the cadastre of Chvaletice No. 1180/36, 1180/9, 1180/10, 1180/11, 1180/18, 1180/12, 1180/13, 1180/14, 1180/17, 1180/16, 1180/15, 1180/8, 1188/3, 1170/7, 1170/4, 1217/1, 1490/2, 1170/3, 1218/1, 1217/3, 1170/11, 1170/10, 1170/13, 1170/12, 1170/8, 1170/15, 1170/9, 1170/16.

In the land register, these lands are recorded as other areas, permanent grassland and water areas.

As part of the survey, the stands were divided into 21 stands (numbers 1-21) in the area of the proposed Trnávka DP and 17 stands (number 22-38) in the adjacent area outside the Trnávka DT. The division of the area of interest according to individual types of vegetation is shown in the picture (Picture no. 94). The characteristics of individual groups of stands are given in the dendrological survey (Annex No. 7).

The character of the tree stands was evaluated mostly as age- and spatially differentiated stands, only in stand 3 the character was evaluated as middle-aged stand, in stands 25 and 26 the character of young stands was evaluated. The suitability of the stands was determined like the others. The growing condition was consistently evaluated as neglected in all stands. All stands are of high biological value. The attractiveness of the location of stands varies depending on whether they are located on the edge of the stand where the attractiveness was assessed as medium or located inside the stand where the attractiveness was assessed as less significant. Most of the stands reach the edge of the territory or lie in close proximity to it.

Picture no. 94: Division of the area of interest into individual types of stands



Area of the proposed DP Trnávka (fieldwork 2017), stands 1 – 21

The territory of the proposed Trnávka DP is different in terms of the character of the stands, the cover of trees, the age or species composition. It is also possible to find areas completely without woody vegetation cover, namely on the majority of the upper plateaus of the SW and SE dumps. Some parts of the upper plateaus are gradually beginning to be inhabited by self-seeding trees, but mostly younger and too loose to be characterized as a continuous connected vegetation with an area of over 40 m2 – described in the dendrological survey as scattered greenery / solitaires.

Different is the upper platform of the northern dump, which is almost completely (except for a small meadow in the middle) covered with mature stands of mostly preparatory – pioneer trees. In terms of species composition and character – looseness, four types with different dominance of characteristic pioneer trees were distinguished – birch and aspen supplemented by Scots pine, acacia and white willow. In two of them, the dominance (once birch and one aspen) is over 95%.

Most of the slopes of the dumps (mostly the outer slopes) show signs of planting as part of reclamation. The inner slopes were left without planting, but due to irregular mowing of grasslands, they are overgrown with air raids.

Plantations of various stands were mostly in larger areas occupying the entire slope of the dump. Exceptions are small regularly alternating areas in the east of the ZÚ (one was 100% blue spruce and the other 80% ash and 20% sycamore).

Even on the slopes there is a relatively narrow species composition of trees, trees are younger than 99% of the limit of 80 cm trunk circumference. The species composition is variable, sometimes aspen with birch prevails, elsewhere ash with sycamore.

Collectively, there is a relatively narrow species composition of tree species in the territory. Most trees are of younger age, with a trunk circumference of less than 80 cm at a height of 1.3 m above the ground (about 99% of trees). These are mainly silver birch and aspen poplar. The number of individuals with a trunk diameter of 1.3 m above the ground greater than 25.5 cm is about 1,182 individuals, mainly milk maple, Scots pine, silver birch, poplars and oaks.

Relatively abundant is also the accompanying shrub stand, which is represented mainly by shrubby shrubbery, hawthorn, black elderberry and rosehip.

In the area of interest there are two areas of continuous shrub stand. The first area is located in the southwestern part of the area of interest with an area of 2.24 ha. This shrub stand consists mainly of *Amorpha fruticosa* and *Crataegus monogyna*. The second is located on the eastern tailings, has an area of 0.64 ha and consists mainly of hawthorn (*Crataegus monogyna*).

Area following the proposed DP Trnávka (fieldwork 2022) stands 22 - 38

Even in this part, the species composition is not very varied, with silver birch dominating the representation of woody plants together with aspen poplar and ash. The whole territory consists mainly of mature trees of various ages. In most of the territory it is an involved stand. Exceptions are two areas in the survey mapped as scattered greenery (at the western border and in the SE part).

The youngest stands, at least according to their growth, are located at the western border of the territory. Young silver birch and aspen poplars can be found here, in which the trunk diameter does not reach 10 cm.

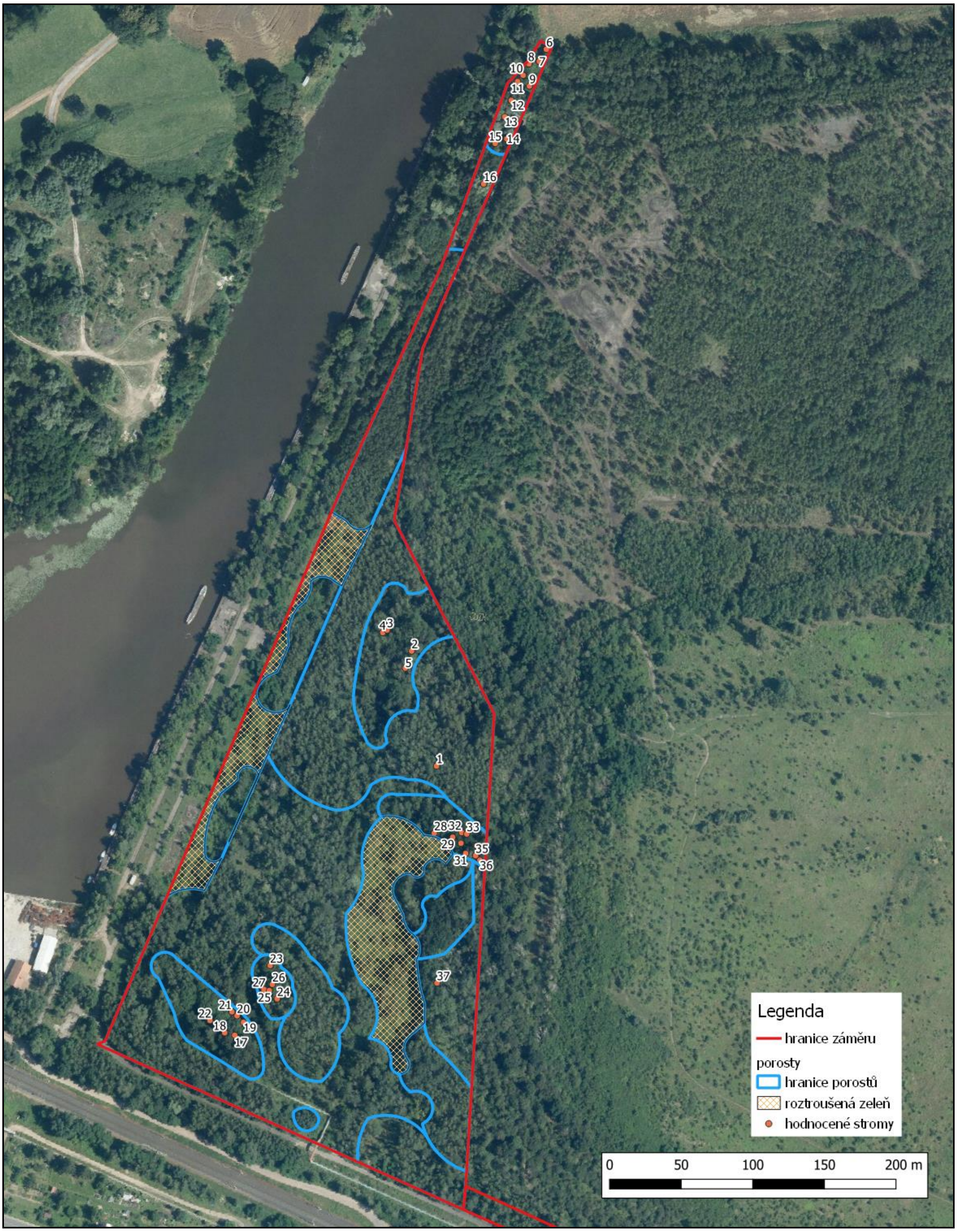
A pipeline runs through the area that drains cooling water from the towers of the Chvaletice power plant. Thanks to its massiveness, the pipeline is insurmountable in the terrain and thus creates an artificial border between the stands that are accessible for management from a different side. Only in the southern part was the character of stands 28 and 29 on both sides of the pipeline similar. The pipeline is evident at stands No. 25, 26 and 27, then along the border of the ZÚ and in the north it turns into the Elbe between stands 22 and 24.

Trees with a trunk diameter at an enumeration height of over 25.5 cm, i.e. evaluated trees, are abundant in the northernmost corner of the area, further in the eastern and southwestern parts of the area. In other parts (including the narrow strip under the area of the proposed Trnávka DP) there are mostly trees below 25.5 cm.

A total of 363 individuals with a trunk diameter of over 25.5 cm at an enumeration height of 130 cm above the ground were recorded in the area of interest, these trees formed a minority. Most of the trees found did not reach a diameter of 80 cm at a height of 130 cm above the ground. An indicative plot of individual valued trees with a trunk diameter of over 25.5 cm at the enumeration height is shown in the picture (Picture no. 95).

There were also solitary individuals of trees on the territory that were not placed in any of the stands. In the area of interest there are 4 solitaires.

Picture no. 95: Approximate drawing of individual awarded trees with a trunk diameter over 25.5 cm at enumeration height



Processing plant area

Within the territory of the proposed processing plant, a dendrological assessment of tree species was carried out in 2019, which is also part of Annex No. 7B.(Janda, 2019)

The assessment was carried out for the following groups of tree species in the area:

1. trees with a circumference of more than 80 cm of trunk circumference (at a height of 130 cm above the ground, or in another part if it could not be measured at this height), including individuals, but are part of the stand involved,
2. woody plants with a circumference of less than 80 cm, if it is a species classified as megaphanerophytes (MFf) and at the same time it cannot be characterized as part of a continuous stand (it is not an undergrowth),
3. involved trees over 40 m2 of area.

The vegetation in the surveyed area is mainly influenced by the current use of the land, namely more or less fundamental surface modifications – i.e. levelling of the terrain, spreading of the soil (fills) and sowing of lawns together with the planting of trees inside the area. Another influence is the abandonment of land to succession, including land with tree stands. The vegetation of the locality itself is therefore rather ruderal, very influenced and altered and only with occasional to sporadic occurrence of other species, such as forest or meadow (except for general species) and e.g. the only wetland species – common reed was found only as part of an overgrown concrete pit and as a raid on fresh landfill.

Dendorological research took place on the following plots of land No. : 1540/1, 954/195 (part), 954/87, 954/117, 954/200, 954/209, 954/116, 954/107, 954/106, 954/105, 954/86, 954/78, 954/82, 954/79, 954/204, 954/209, 954/46, 954/77, 954/207, 954/205, 954/45, 954/126, 954/127, 954/127, 954/77 54/44, 954/47, 954/48, 954/249, 954/248, 954/163, 954/55, 954/50, 954/53, 954/54, 954/239, 954/241, 954/242, 954/238, 954/64, 954/238, 954/237, 954/63, 954/236, 954/102, 954/41, 954/40, 954/216, 954/67, 954/73, 954/72, 954/75, 954/74, 954/81, 954/126, 954/127, 954/261, 954/209, 954/200, 954/205, 954/206, 1540/3, 1540/4, 1540/5, 1540/8 and possibly unbuilt parts of building plots 497, 498/1, 501, 499, 500, 541, 537, 612, 533, 534, 512, 515, 541, 579, 554, 556, 557, 558, 507, 495, 496, 504, 503, 498/2, 499 in the cadastral register. Chvaletice, while some plots are only a part of them.

The vegetation of the site was divided into two subtypes for the purposes of assessment, the principle of division is the character of the area, with the first type including all areas in the built-up area (marked A) and the second type of areas of tree stands (marked B), see Picture no. 96. A total of 200 tree species were identified in the processing plant. Their exact list is given in the dendrological survey.(Janda, 2019)

<u>A – areas in the built-up part of the complex</u>

The first groups of trees in this part of the area are trees growing in front of the entrance to the premises, in the temporary parking lot and along the siding. There are also trees that are part of the built-up area itself. These are scattered mature trees that were planted as protective greenery with hygienic properties. Furthermore, in this part of the area there is a seed raid, which creates involved growths. Several tree species over 80 cm were found in the involved stands, but most of the trees forming their part do not reach a circumference of 60 cm. It is a plank caused by the absence of maintenance of the stands. Part of the greenery is made up of planted exotic species, now without maintenance. Ornamental shrubs (Chinese juniper, cypresses, creeping cultivars of ceravs, etc.) were not included in the study. Most solitary trees in the area have approximately similar character, habitus and health status. If it is not a seed raid, which forms dense and malleable stands (without thinning and single-cutting), the character of planted trees is very similar. These are plantings in the same period when fast-growing species – aspen poplar, silver birch and Scots pine were supposed to fulfil a protective (and hygienic) function and are mostly planted in lines (windbreaks, dust collectors, etc.), often along fences or perimeter of roads and halls.

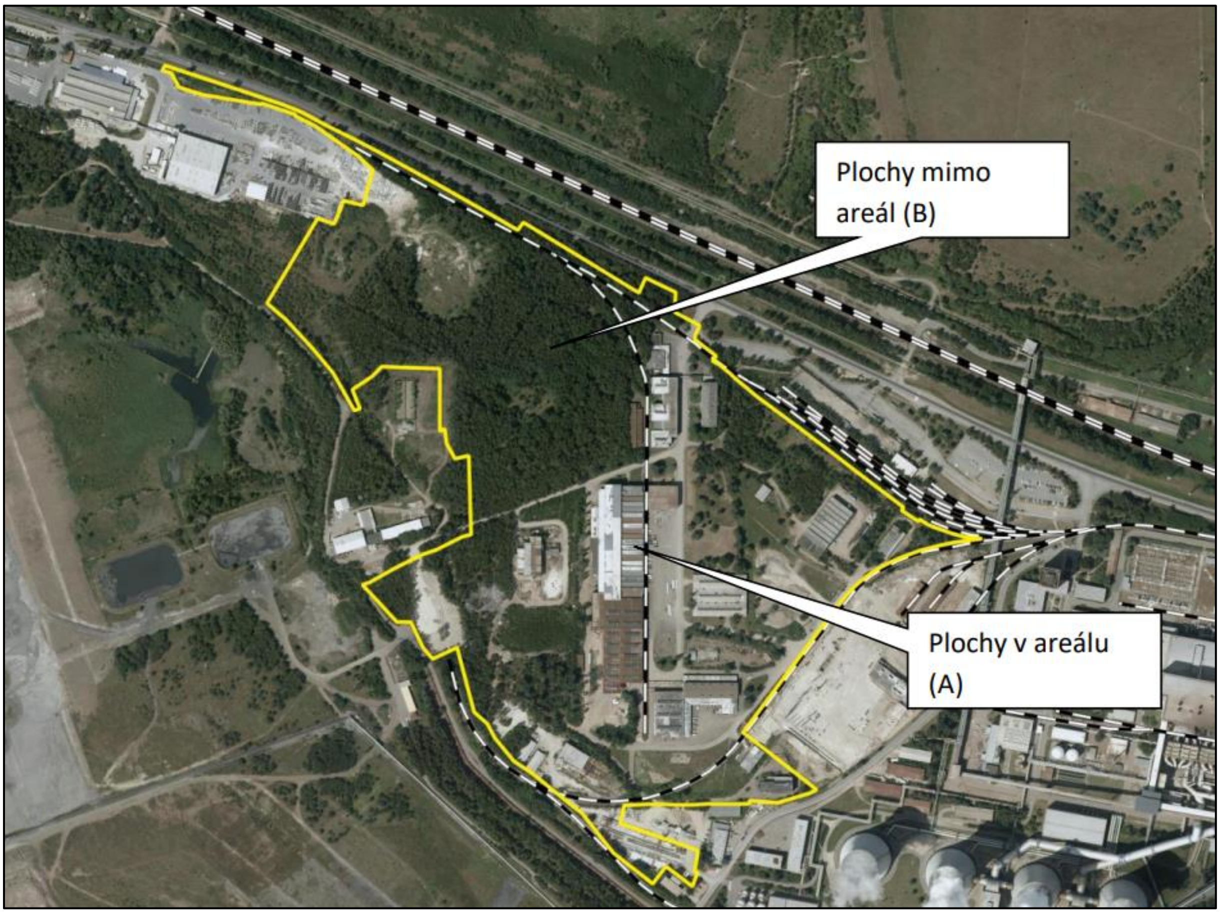
The following tree species were found in the built-up part of the plant premises: Scots *pine (Pinus sylvestris*), Babyka maple (*Acer campestre*), silver birch (*Betula pendula*), aspen poplar (*Populus tremula*), black elder (*Sambucus nigra*), blue spruce (*Picea pungens), deciduous larch (*Larix decidua*), Weymouth pine (*Pinus strobus*),* Douglas fir Species which grow here include *Pseudotsuga menziesii*, Canadian poplar (*Populus x canadensis*), green linden (*Tillia x euchlora*), red oak (*Quercus rubra*), beech (*Fagus sylvatica*), yew (*Taxus baccata Fastigiata*), sycamore maple *(Acer pseudoplatanus*), white willow *(Salix alba*), black pine (*Pinus nigra*), the giant shark (*Thuja plicata*).

B – Areas of woody plants

In Part B of the plant area there are open, forest and abandoned areas with extensive stands of trees. These are areas of vegetation in varying degrees of involvement, height and damage. The structure is similar – young stands often consist only of silver birch; older stands are a combination of silver birch up to 70 cm in circumference (with the exception mentioned below) and aspen poplar up to 75 cm in circumference (again with exceptions). On parts of the slopes, they resemble the pioneer forest (biotope X12 - Raids of pioneer trees). It includes two full-grown oaks (one at the premises of TIBA BETON CZ, s.r.o.). Due to the extent of the area and the huge number of trees, it is possible that some trees over 80 cm were overlooked or not found.

The following tree species were found in this part of the complex: Canadian *poplar (Populus x canadensis*), silver birch (*Betula pendula*), aspen poplar (*Populus tremula*), Scots pine (*Pinus sylvestris*), penduculate oak (*Quercus robur*).

Picture no. 96 Division of plant area for dendrological assessment (Janda, 2019)



6. Population and public health

Demographics

The project lies on the territory of the municipalities of Chvaletice and Trnávka. The following table shows the population of the two municipalities.

Table No. 91: Population statistics in the municipalities concerned (CZSO, 2021)

	Chvaletice	Trnávka
Population	2 910	208
Number of women	1 470	108
Number of men	1 440	100
Total population aged 0-14	422	33
Total population aged 15-64	1 899	125
Total population aged 65 and over	589	50
Average age	43,5	40,6

Note: as of 31/12/2021, unless otherwise stated

Public health

Information on public health in the region is available in the Health Care Yearbook of the Czech Republic, published by the Institute of Health Information and Statistics of the Czech Republic (UZIS, 2022). The health status of the population in the Pardubice district is summarized in the following table.

Table No. 92: Health data on the population in the Pardubice Region (CZSO, IHIS, 2022)

Total hospitalization in hospital		89 456
Incapacity for work	Number of reported cases per 100 NEM. poj.	42,87
	average % of incapacity for work	4,701
Selected diseases per 100 000 inhabitants	Chickenpox	545,5
	Tuberculosis of the respiratory system	4,4
	Diabetes	7 665,6
Number of newly reported birth defects per 10,000 live nar. (year 2018)		715,80

Note: as of 31/12/2021, unless otherwise stated

Recreational and sports activities

Sports facilities

Sports grounds and recreational facilities are not registered in the area of interest or in its vicinity. In the wider surroundings there is the area of the Kladruby stud farm, within which about 2 km northeast of the project there are hippo trails (equestrian trails, trails for horse riders). The nearest commercial sports ground is the football field FK Baník Chvaletice, which is located about 1 km west of the project.

Cycling, hiking

In the area of interest there are no official recreational and sports areas such as cycle paths, hiking trails, etc. The nearest starting points for hiking trails are in the Hornická čtvrť and Chvaletice, from where the trails lead south towards the ridge of the Iron Mountains. Another tourist route is located about 1.5 km east of the project and connects the villages of Kladruby nad Labem, Řečany and Zdechovice.

The nearest cycle path is cycle path 2. Labská, which is located about 800 meters north of the project areas. A new cycling route Pardubice – Týnec nad Labem is currently being prepared. This will include the use of existing roads and the construction of new ones. The route is planned at the southern border of the proposed mining area. An asphalt road leading from Trnávka to the level crossing at the turn-off to road II/322 will be used. A new cycle path should be built, which will lead from the aforementioned crossing west to the Elbe and further to Chvaletice and Týnec nad Labem. This cycle path will run parallel to the railway on its northern side, i.e. south of the tailings outside the planned mining area.

Motorcycle Sports (MX Motocross)

The northern part of the area of interest is due to the condition of the terrain used as an unofficial training track for individual hobby motocross (entry into the area is prohibited).

Hunting and hunting activities

The area of the project falls within the territory of the official hunting ground and is used for hunting activities of the local hunting association (MS Řečany nad Labem).

Information about hunting (http://ms-recany-nad-labem.webnode.cz): MS Řečany nad Labem manages 1300 ha of areas, approximately 1/3 is forest and the rest of the field. The hunting ground is located in the cadastre of the villages of Řečany nad Labem, Trnávka, Labětín, Spytovice and Zdechovice. Over the past 20 years, the ratio of the amount of game has changed significantly to the detriment of small. Pheasants in some localities do not occur at all and generally always in the number of several pieces. Hares can be seen throughout the hunting area, outside the forests, but again only in the number of a few individuals. The presence of black game has a major impact on this condition. It settled here around 1993. Before that, it was sporadically found in corn. In particular, its presence in the locality of the Kýp below the Chvaletice power plant caused that small game and displaced roe deer were gradually liquidated. Also, the high number of foxes, despite the annual catch of about 20 pieces, has a considerable share in the minimum numbers of pheasants and hares. The numbers of roe deer are slightly decreasing. Of the overpopulated predators, these are mainly buzzards, hawks and hawks.

Within the area is installed several high seats for hunters. According to information from the website of the hunting association from 2017 and 2018, the subject of hunts in the area of interest are wild boar *(Sus scrofa*), which are overpopulated here, and possibly also red foxes (*Vulpes vulpes*).

Fishing

The nearby section of the Elbe River falls within the territory of the official fishing ground called Revír Labe 26 of the local fishing organization (MO Řečany nad Labem).

- Fishing area: Labe (ID: 451029)
- Area: 11 km, 74 ha
- Administrator: MO Řečany nad Labem
- Nature of the water: non-trout

Information about the fishery: From the inlet of the Černá strouha (right tributary) at the ř.km 98.4 to the mouth of the Opatovice Canal into the Elbe below the village of Semín at ř.km 110.1. Fishing from vessels allowed on the mainstream, loading of baits and baits allowed. On the mainstream, the upper rate of carp is set at 65 cm. Carp caught in excess of 65 cm shall be returned as gently as possible to the water at the place of catch. The district includes decommissioned arms and reservoirs from the former ČD Chvaletice stop.

According to older and mostly fragmentary information of fishermen on the www.mrk.cz discussion server, the area of interest mainly mentions the occurrence of, for example, fish species such as bream *(Abramis brama*), common carp (*Cyprinus carpio*), red deer (*Leuciscus cephalus*).

7. Tangible assets

In the area of the proposed mine area, apart from the land itself, there are no tangible assets. In the area of the planned background there is a wastewater treatment plant. In the area of the processing plant there is one building with a house number, it is a building used for production and storage with No. 226. In addition to this building, there are other buildings in the ZZ area without No. p./No. e.

8. Cultural heritage

Pursuant to Act No. 20/1987 Coll., on State Heritage Care, the Government of the Czech Republic declares national cultural monuments (NCP) to be national cultural monuments and sets the conditions for their protection those cultural monuments that form the most important part of the nation's cultural wealth. According to this Act, the Ministry of Culture of the Czech Republic declares immovable and movable assets or their sets as cultural monuments (KP):

a) which is important evidence of the historical development, way of life and environment of society from the earliest times to the present, as manifestations of the creative abilities and work of man from various fields of human activity, for their revolutionary, historical, artistic, scientific and technical values,

(b) which are directly related to important personalities and historical events.

According to the map server of the National Heritage Institute (NPÚ), no World Heritage Sites, national cultural monuments or cultural monuments administered by the National Heritage Institute are registered within the project area.

The nearest UNESCO World Heritage Site is the Landscape for Breeding and Training of Ceremonial Carriage Horses in Kladruby nad Labem, located about 200 m north of the project area. The stud farm itself is protected as an NKP. In the case of the stud farm, it is the oldest continuously existing stud farm in the world, which was founded in 1579, still serves its original purpose today and was registered on the list in 2019. It represents an area that connects a unique national cultural monument, which documents the centuries-old breeding and training of the unique breed of Kladruby horse and its broader context in related villages – Kladruby nad Labem, Selmice, Semín. This rare breed of Baroque galacarosières was bred there and the landscape was "tailor-made" for it in the past centuries (NPU, 2019). Details of the landscape conservation area and the protective zone of the Stud Farm National Park in Kladruby nad Labem are given in Chapter B.1.8.

The next closest National Heritage Site in the wider vicinity of the project is the Kačina Chateau, located about 8.5 km southwest of the project area.

In the vicinity of the area of interest there are several cultural monuments, of which the nearest 5 are listed in the following table. These are three churches in the villages of Chvaletice, Řečany nad Labem and Selmice, as well as the building of a smithy in the village of Labské Chrčice and the construction of a primary school in Chvaletice.

Picture no. 97: Localization of the project according to the map of cultural monuments (NPÚ, 2022)

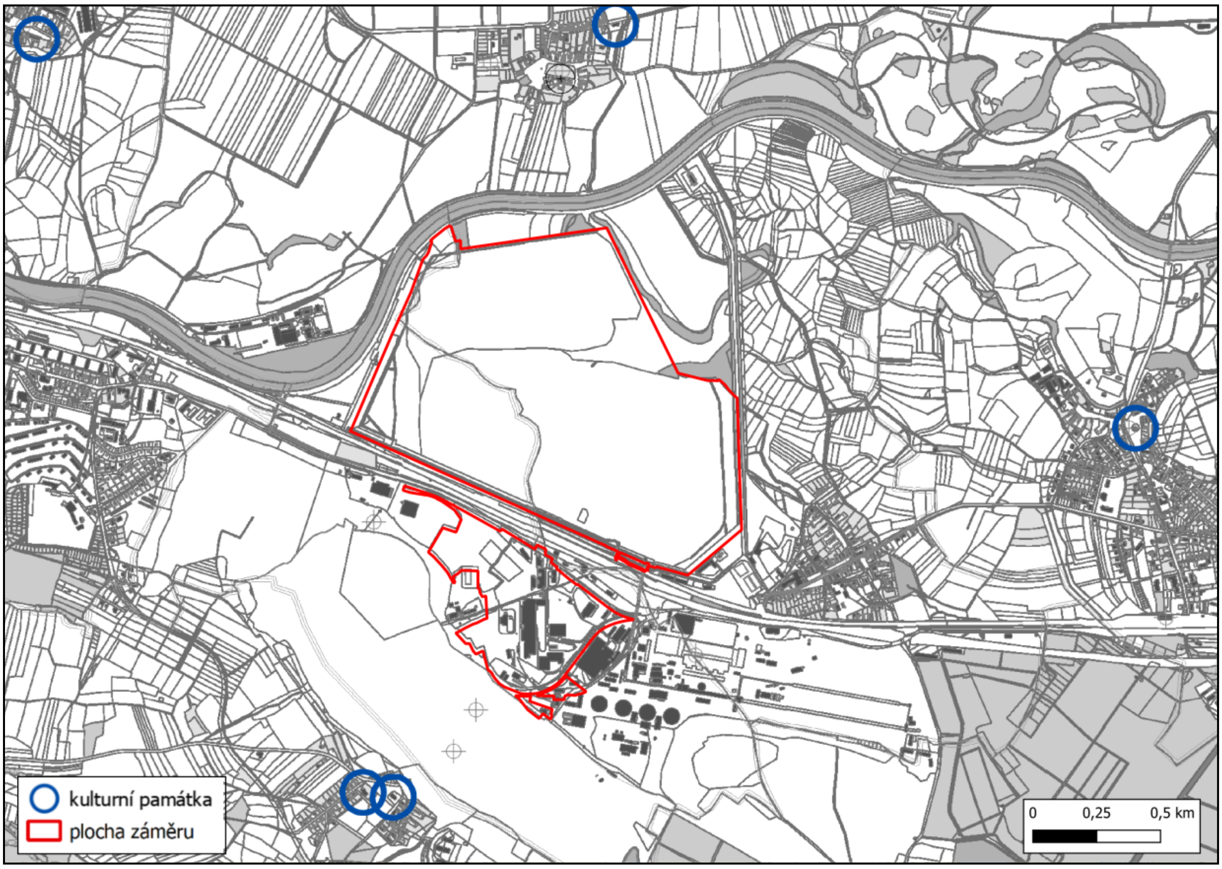


Table No. 93: Immovable cultural monuments in the vicinity of the project (NPÚ, 2022)

Register No.	c.a.	Part of the municipality	Monument	No., Street, square/location
50176/6-6124	Chvaletice	Hornická čtvrť	Evangelical Church	No. 66
103740	Chvaletice	Hornická čtvrť	Elementary school	No. 124
51114/6-6211	Labské Chrčice	Labské Chrčice	forge	No. 46
6-2135	Recany nad Labem	Recany nad Labem	parish church of St. Mary Magdalene	No. 335, 1st May
49639/6-6023	Selmice	Selmice	Church of sv. Lawrence	-

III. AN OVERALL ASSESSMENT OF THE STATE OF THE ENVIRONMENT IN THE AFFECTED AREA IN TERMS OF ITS CARRYING CAPACITY AND THE ASSUMPTION OF ITS LIKELY DEVELOPMENT IN THE EVENT OF NON-IMPLEMENTATION OF THE PROJECT, IF IT IS POSSIBLE TO ASSESS IT ON THE BASIS OF AVAILABLE ENVIRONMENTAL INFORMATION AND SCIENTIFIC KNOWLEDGE

From the way the land is used, or from the mutual ratio of cultures in the territory of the affected and surrounding municipalities, it is possible to determine the coefficient of ecological stability of the given area. In this case, the coefficient of ecological stability (K_{es}) is calculated as the ratio of relatively stable areas and relatively unstable areas. The following are considered to be stable areas: forest lands, permanent grasslands, water areas and streams, orchards, vineyards, part of the item other areas (included in this calculation from the item Other areas: greenery, cemeteries, recreational and sports areas). Unstable areas are: arable land, built-up areas, hop fields, part of the item other areas (in this calculation, the following areas are included from the item Other areas: track, roads, other roads, handling area, mining area, other area, infertile land).

This assessment provides a global ready idea of the stability or instability of larger territorial units and can be calculated for any territory (cadastre, river basin, district, biogeographic region etc.).

Table No. 65: Kes values on affected and adjacent c.a.

	c.a. Chvaletice	**c.a. Trnávka**	**c.a. Kladruby n. Labem**	**c.a. Selmice**	**c.a. Řečany n. L.**	**c.a. Zdechovice**
Total land area (ha)	850	363	2 381	542	552	862
Arable land (ha)	186	98	487	189	332	225
Gardens (ha)	17	7	24	7	25	17
Orchards (ha)	5	-	1	-	4	7
Permanent grassland (ha)	23	36	469	177	37	95
Forest Floor	158	14	1 217	102	33	347
Bodies of water (ha)	9	19	52	21	30	27
Built-up areas (ha)	45	12	28	8	22	13
Other areas (ha)	406	178	103	38	69	132
Ecological stability coefficient K_{es}	**0,33**	**0,26**	**2,85**	**1,30**	**0,31**	**1,33**

Note: *data for 2021 (**czso.cz**), without breakdown of other areas*

Classification of K_{es} coefficients (Lipský, 1999):

- **Kes < 0.10**: areas with maximum disruption of natural structures, basic ecological functions must be intensively and permanently replaced by technical interventions
- **0.10 < Kes < 0.30**: an area that is over-utilized, with a clear disruption of natural structures, basic ecological functions must be systematically replaced by technical interventions
- **0.30 < Kes < 1.00**: an area intensively exploited, especially by large-scale agricultural production, the weakening of self-regulatory processes in agroecosystems causes their considerable ecological instability and requires high deposits of additional energy

- **1.00 < Kes < 3.00**: a fairly balanced landscape in which technical buildings are relatively in harmony with the preserved natural structures, resulting in a lower need for energy material inputs
- **Kes > 3.00**: natural and near-natural areas

The value of K_{es} shows that in the case of the cadastral area of Trnávka, it is an area of above-average use, with a clear disruption of natural structures, and basic ecological functions must be systematically replaced by technical interventions.

From the point of view of the cadastral area of Chvaletice, as well as the cadastral area of Trnávka, it is close to the imaginary border between the territory that is used above average, with a clear disruption of natural structures, and the area intensively used, especially by large-scale agricultural production, the weakening of self-regulatory processes in agroecosystems causes their considerable ecological instability and requires high deposits of additional energy.

However, the generalized evaluation using K_{es} shows somewhat misleading results without a closer analysis of the data.

In the Czech Republic, arable land generally decreases the value of K es the most. In particular, typical large-scale agrocenoses are ecologically unstable and require essential material and energy inputs. The area in question lying in the agricultural landscape of the Elbe region is also characterized by these areas. This is especially the case of the cadastral area of Řečany nad Labem, where arable land makes up 60% of the area of the cadastral area. In the case of Trnávka, however, it is only 27%, as other areas dominate significantly (49%). In this case, it is not possible to include them only in unstable surfaces. In particular, the area of the project itself, i.e. the former tailings ponds, appears to be stable from this point of view. However, a smaller part of the other areas lies on the power plant's land and also on roads, and these areas are unstable. The situation is similar in the case of Chvaletice, where the rest of the area makes up 48% of the territory. A significant part of the other areas belongs to an unstable industrial area, including a power plant and 2 quarries, but a significant part also includes a reclaimed area of tailings ponds and a former manganese surface quarry, part of which has already been biologically reclaimed and is characterized by higher ecological stability.

Therefore, it can be stated that the cadastral area Trnávka and c.a. Chvaletice is characterized by higher ecological stability than the data in the table above. However, this stability is partly based on areas artificially transformed by man, where natural processes already prevail over former mining and industrial activities.

The other cadastral areas (Kladruby n. L., Selmice, Zdechovice) fall into the category of a fairly balanced landscape, in which technical buildings are relatively in harmony with the preserved natural structures, resulting in a lower need for energy-material deposits. This is due to the high forestation of the area (Zdechovice) together with a large proportion of permanent grasslands (Selmice and Kladruby nad Labem). A significant part of the area of these two cadastral areas has been historically used for horse breeding, so there are extensive pastures.

Furthermore, it is difficult to assess some components of the environment, such as air quality, acoustic situation, water quality etc. In the previous parts of Chapter C, however, the individual components of the environment were described in relatively detail in terms of quality.

On the basis of these data, it is possible to state that the quality of the environment in the area of interest corresponds to the location in the area of the East Bohemian Table, where agricultural landscape generally prevails.

However, there are industrial plants in the vicinity that are used as point sources of water, air or noise pollution. The most important of these is the Chvaletice power plant, as a result of its operation, the hygienic limits for noise are exhausted and exceeded, especially in the area.

From the point of view of air, the pollution limits are safely met, including benzoapyrene, for which a slight exceedance was indicated in one mapping square of 1 x 1 km in the territory of Chvaletice at the time of the preparation of the notification of the project. The improvement of the situation corresponds to the generally positive development in the Czech Republic in recent years.

The area is further burdened by former and current open-pit mining of mineral resources. From the former mining, the source of contamination of water in particular is the sludge pond, i.e. the area of the project. Other remnants of historical mining, i.e. especially the surface quarry of pyrite and manganese raw material, have been practically erased.

Surface mining of mineral resources in the wider area takes place in two quarries and further in distant sand pits. The area of the project itself is not affected by these activities, the most adverse effects are mainly in connection with the road transport of aggregates in individual municipalities, from this point of view Zdechovice is the most affected.

The natural transport axes of the area are oriented in the west-east direction (roads II/322, I/2, railway 010 Prague – Česká Třebová, limited boat transport on the Elbe). Locally, traffic negatively affects the settlements through which these transport routes pass.

The landscape structure and land use is already stable after previous dynamic changes. This means that the development of the area without the implementation of the project would not mean any significant changes compared to the situation described in Part C. Substantial changes could occur in connection with the end of the lifetime of the Chvaletice power plant or the nearby quarries, and in terms of impacts, these changes would be environmentally favourable.

PART D COMPREHENSIVE CHARACTERISTICS AND ASSESSMENT OF POSSIBLE SIGNIFICANT IMPACTS OF THE PROJECT ON THE ENVIRONMENT AND PUBLIC HEALTH

I. CHARACTERISTICS AND EVALUATION OF THE MAGNITUDE AND SIGNIFICANCE OF THE ANTICIPATED DIRECT, INDIRECT, SECONDARY, CUMULATIVE, CROSS-BORDER, SHORT-TERM, MEDIUM-TERM, LONG-TERM, PERMANENT AND TEMPORARY, POSITIVE AND NEGATIVE IMPACTS OF THE PROJECT RESULTING FROM THE CONSTRUCTION AND EXISTENCE OF THE PROJECT (INCLUDING POSSIBLE DEMOLITION WORK NECESSARY FOR ITS IMPLEMENTATION), THE TECHNOLOGIES AND SUBSTANCES USED, POLLUTANT EMISSIONS AND WASTE MANAGEMENT, THE CUMULATION OF THE PROJECT WITH OTHER EXISTING OR PERMITTED PROJECTS (S TAKING INTO ACCOUNT THE CURRENT STATE OF AREAS PROTECTED UNDER THE ACT ON NATURE AND LANDSCAPE PROTECTION AND THE USE OF NATURAL RESOURCES WITH REGARD TO THEIR SUSTAINABLE AVAILABILITY) TAKING INTO ACCOUNT THE REQUIREMENTS OF OTHER LEGAL REGULATIONS FOR ENVIRONMENTAL PROTECTION

Influences are evaluated according to their significance using a verbal scale: positive – zero – insignificant – negative – significantly negative. The following impact attributes were considered in the significance assessment:

- direction (favorable – neutral – unfavorable),
- size (low – medium – high),
- reversibility (refundable – non-refundable),
- duration (short – medium – long-term – permanent),
- frequency (one-time – recurring – sporadic)
- scope (local – regional – national – international – cross-border)
- probability of occurrence (in the interval 0 – 1 according to probability)

Where appropriate, impact assessments are divided into a mining phase and a post-reclamation phase.

An integral part of the impact assessment is the possibility of protection against them, i.e. a proposal of measures to prevent, reduce or eliminate the impacts. These measures are subject to commentary and evaluation.

After considering all of the above-mentioned factors, including the proposed measures, the impact is evaluated in summary terms in its overall significance on a scale of:

- favourable
- zero
- insignificant
- inauspicious
- significantly unfavorable.

However, a one-word generalizing evaluation using a verbal scale can be taken rather as an indicative one, the influence must be assessed in the whole context of the above factors.

At the same time, the evaluation in the verbal scale itself does not imply the admissibility or inadmissibility of the implementation of the plan. The decision on the implementation of the project is issued by the competent administrative authority in proceedings pursuant to special legal regulations. In accordance with § 1 Art. 3 of Act No. 100/2001 Coll. to obtain an objective expert basis for issuing a decision.

1. *Effects on the population and public health*

Effects on public health

To assess the impact on public health, a separate study was prepared and updated to the revised documentation. The author of the study holds a certificate of professional competence in the field of Public Health Impact Assessment (HIA) according to the implementing decree of the Ministry of Health No. 353/2004 Coll. to Act No. 100/2001 Coll. on Environmental Impact Assessment.(Zemancová, 2023)

The evaluation is based on the results of the revised noise study and the dispersion study. Risk characterization was performed for pollutants in the air (NO(Králíček, 2023)(Zambojová, 2022)$_2$, PM10, PM2.5, benzene and benzo(a)pyrene, sulphuric acid, ammonia and manganese) and for noise from the operation of the project and related traffic. The self-evaluation contains specific details; however, the study's conclusions are outlined below. The assessment applies to the current operation of the mining area and the processing plant in the Chvaletice Industrial Zone.

Conclusion of the assessment in relation to air pollution

The actual implementation of the assessed project will not cause exceeding the pollution limits applicable to nitrogen dioxide NO2, suspended particles of the PM10 and PM2.5 fractions, or the carcinogens benzene and benzo(a)pyrene. The air pollution contributions from the implementation of mining activities in the proposed Trnávka DP and the operation of the processing plant are very low and almost do not affect the resulting values of concentrations of monitored pollutants in the air in the given locality.

The risk characterization for classical air pollutants was carried out by the method of relative risk calculation, which represents the ratio of the probability of occurrence of certain syndromes in the exposed and unexposed population. On the basis of the comparison of the average annual concentrations of NO2 with the guideline AQG value of 10 µg.m-3 recommended by the WHO, which is already slightly exceeded in the given area (without the intention). It can be affirmed that the project's inherent contributions to air pollution, specifically NO2, within the range of tenths to hundredths of µg.m-3, do not result in an elevated health risk for the exposed population if the project is implemented. When characterizing the risk of the sum of new contributions of the project and the pollution background to health problems related to chronic exposure to particulate matter (PM10 and PM2.5), no significant increase in the risk of health problems demonstrated by the latest WHO studies was found. To partially quantify the risk of chronic effects of PM10 and PM2.5 air pollution, the relationships derived for premature mortality, morbidity including hospitalizations and the occurrence of respiratory symptoms were used. The commencement of mining activities in the proposed Trnávka DP and the operation of the adjacent processing plant will not cause an increase in premature mortality in the local population. The intention will not cause new cases of chronic bronchitis or new manifestations of asthma in children, nor will the course of cardiovascular or respiratory diseases in the population worsen to such an extent that would require hospitalization. According to the indicative calculation according to the recommended methodology, the number of days with respiratory morbidity in children could increase by 0.3 days per year as a result of the quantified increase in the contributions of average annual PM10 air pollution, if all children in the population in the age cohort of 6 – 12 years were exposed to continuous exposure to the maximum concentrations quantified in the nearest residential area. The rise in the count of days with restricted activity, attributed to exposure to fine dust particles PM2.5, is reported as a nominal unit of 0.3 days annually. However, given the numerous uncertainties inherent in the initial calculation assumptions and the methodology's derived relationships, this increase is deemed hypothetical and practically negligible. Nevertheless, the use of all available dust reduction agents is recommended, especially as part of dust resuspension measures.

Risk characterization for carcinogenic substances was performed by the method of calculating the probability of an increase in the incidence of cancer above the normal incidence in the population (ILCR) with lifetime exposure to the evaluated pollutants benzene and benzo(a)pyrene. The calculation shows that the acceptable level of increase in lifetime carcinogenic risk from exposure to benzene and benzo(a)pyrene is currently met at the evaluated site. After the commencement of mining activities in the proposed Trnávka DP and the operation of the processing plant for the extracted raw material, there will be no increase in the probability of the occurrence of cancer in the exposed population on the basis of the quantified contributions of air pollution of the average annual concentrations of carcinogenic substances compared to the situation without the implementation of the plan.

The specific air pollutants produced by the project, which will be H2SO4, ammonia, hydrogen sulphide and manganese, were evaluated using screening risk characterization by comparing reference exposure limits, reference concentrations and limit exposure doses set by world scientific institutions with the preferred choice of WHO. The results of this assessment do not indicate any possibility of a negative impact on public health, the contributions of the intention of these pollutants are completely insignificant and far below the level of the reference values.

Conclusion of the assessment in relation to noise exposure

On the basis of the characterization of the risk from exposure to acoustic air pollution from the implementation of mining activities in the proposed Trnávka DP and the operation of the processing plant, including the stage of construction of the project, and the implementation of anti-noise measures, it can be stated that the acoustic pollution produced by this project is unlikely to have a negative impact on public health.

During the period of execution of the construction work, the noise pollution at the nearest residential area will remain with a sufficient margin below the level of the hygienic limit LAeq,14h = 65 dB for the daytime, the noise pollution from the construction site was quantified by an acoustic study at the level of up to 59.1 dB during the daytime. In the case of operation of sludge pumps at night, this noise will also be at a level far below the hygienic noise limit LAeq,8h = 45 dB for the nighttime, noise levels at the nearest residential area are predicted by model calculations at a level below LAeq,8h < 35 dB. In addition, the construction noisy work will be of a temporary nature.

In the phase of normal operation, acoustic air pollution from the premises on the border of the protected outdoor area of buildings and the protected outdoor area of Chvaletice, Zdechovice, Řečany nad Labem, Selmice and Hornická čtvrť should meet the hygienic limits for noise from establishments during the day and night, which are at the same time without corrections and threshold values of proven effects of noise pollution from stationary sources. However, this only applies if the premise that noise levels from other enclosed areas in the vicinity will not exceed the hygienic limit of $L_{Aeq,8h} =$ 50 dB during the day and LAeq,1h = 40 dB at night in 2028 and further in the area of residential areas of the surrounding municipalities is applied. The contributions of the proposed project to the overall noise level from establishments, in the range of the first tenths of a decibel, are negligible from a public health perspective. They are undetectable by sensitive direct noise measurement devices and imperceptible to the human ear. In the case of Trnávka, where it is indicated that other sources of noise have reached or exceeded the hygienic limit at night, there will be no further increase in noise due to the operation of the assessed project, the quantified contributions of acoustic air pollution at night are zero in Trnávka, so the impact of this project on public health is zero.

The changes in the level of traffic noise to the total noise emitted from the evaluated roads quantified by an acoustic study show an increase of 0.0–0.4 dB along the used sections. These changes in traffic noise levels are not acoustically significant, they are objectively undetectable by measurement, and they are again smaller than the value recognizable by the human hearing organ. Therefore, the inhabitants of buildings adjacent to roads on transit routes should not subjectively notice a change in the overall level of traffic noise in the event of the implementation of the project. Changes in traffic noise levels in connection with the implementation of the assessed project can be evaluated as insignificant in the context of public health. As part of the quantitative risk characterization, a calculation of the relative risk of high nuisance and disturbance during sleep by traffic noise is also performed, which did not show any change in the number of people affected by these feelings. The calculation of the relative risk or attributive fraction of ischemic heart disease also did not show any significant change in the level of risk of coronary heart disease as a result of the detected sound pressure level from traffic on roads II/322 and I/2. The decrease in traffic noise levels in Chvaletice due to the construction of an acoustic screen at the II/332 road is clearly a positive aspect of the project from the point of view of public health.

Noise from the railway is not evaluated in detail by the public health impact study, as one arrival of a train in the morning and one departure in the evening exclusively during the daytime can be interpreted as an isolated noise event during the day, lasting only a few minutes, which cannot have an impact on public health.

In summary, the processor of the evaluation states that the assessed project is **acceptable** in view of the above-mentioned uncertainties from the point of view of the possible impact on public health by the spread of the evaluated air pollutants. The project is unlikely to significantly exacerbate the burden on the affected population compared to the existing situation.

The acceptability of the project from the point of view of the propagation of noise pollution will have to be evaluated within the trial operation, when they will be verified by authorized measurement of the value of night noise levels from establishments in the built-up areas of the surrounding municipalities and, if necessary, anti-noise measures will be implemented to meet hygienic requirements. The implementation of the project brings a practically unchanged exposure scenario to traffic noise emissions, and therefore it can be expected that the current level of risk of damage to public health caused by traffic noise in the given area will not change.

A positive aspect of the project is the construction of an acoustic screen at the II/322 road, which will reduce the acoustic pollution of traffic noise by up to 8 dB in the Chvaletice built-up area, which will significantly contribute to reducing the intensity of nuisance, sleep disturbance and the risk of cardiovascular disorders in the exposed population.

In addition to the study of the impact on public health, it can be stated that further measures for prevention, minimization or compensation of impacts on public health are proposed in Chapter D.IV. Based on the above, the impact on public health is assessed as **insignificant** in all phases of the project.

Social and economic influences

The assessed intention of Mangan Chvaletice, s.r.o. exceeds the scope of a "small" investment and will be reflected in the regional development of the Pardubice Region and partly in other regions in the Czech Republic.

From an environmental point of view, this is undoubtedly a suitable location for production. The investment will not be implemented on a so-called "greenfield", but in the location of an industrial area, which is partly made up of brownfields, i.e. abandoned or little-used industrial buildings. During the construction of the processing plant and the opening of the deposit, there will be no occupation of valuable natural or park areas, which usually causes feelings of disruption or devastation of the environment, and the associated negative reactions of local residents.

On the contrary, the implementation of the plan brings remediation and reclamation of the old environmental burden, which has been present in the locality for decades and its existence may evoke feelings of threat to health, property and basic human needs in the population of adjacent municipalities. The elimination of this risk will certainly be perceived positively by the public. After the remediation and reclamation has been carried out, the area in the area of the proposed DP Trnávka will be handed over to the public for safe use. A combination of natural and recreational functions is expected, which will be specified in more detail in the next phases of the project preparation.

During the construction phase, it is possible to establish connections with regional companies and the use of their professional focus. The implementation of the construction of the new plant will mean an impulse for regional suppliers, especially in the field of construction work, but also in related fields.

In 2020, there were 618 companies with more than 50 employees and only 13 companies creating more than 1000 jobs in the entire region (RES 2020). From this point of view, the planned plant for the production of manganese products will be one of the medium-sized employers in the region, the creation of approximately 380–400 new jobs is planned. In the administrative district of municipalities with extended competence of SO ORP Přelouč there are approximately 5,900 economic entities, of which 21.1% are engaged in industry. With a total of 22 companies employing 50 to 249 individuals and only 2 companies with over 250 employees in the entire (micro)region, it is evident that the forthcoming plant will emerge as a significant employer in this micro-region.

In the phase of full operation, the direct impact will be the creation of approximately 380–400 jobs in the new plant, and potential additional (secondary) jobs will be created in the field of transport, logistics, as well as outsourced services necessary for the normal operation of the plant. A theoretical impact can also be expected for potential suppliers of selected raw materials.

The investor invests considerable funds in the construction and purchase of state-of-the-art technologies, which can also be a promise of a high standard of care for employees and a guarantee of their permanent social security.

A significant impulse for the local economy will also be provided by mandatory financial fees for the municipalities whose cadastre will be affected by recycling – Trnávka and Chvaletice. The notifier will pay mandatory payments from the mining area and in particular from the extracted reserved minerals to municipalities and the state pursuant to Part Eight of Act No. 44/1988 Coll., as amended, and Government Regulation No. 98/2016 Coll., on reimbursement rates. The economic benefits of the project thus consist in direct payments to the state and municipalities for 1 calendar year:

- payment of CZK 1,000 per commenced hectare of DP in the case of a permitted HČ (CZK 120,000, income of municipalities),
- manganese CZK 2,308 per tonne (CZK 115.4 million, of which 38% is the income of municipalities).

Municipalities will be able to use these fees for a wide range of investment development activities. The investment is expected to yield a positive impact on both the revenue and, to some extent, the expenditure side of the public finance system.Mandatory social security and health insurance contributions can be expected depending on the size of statutory contributions in the year of commencement of operation.

Any other economic benefits must be considered voluntary, beyond the legal framework, but they are provided by the investor on the basis of individual negotiations with municipalities and other entities.

Additionally, we must acknowledge the potential to reshape the image of the Czech Republic as a distinctive hub for high-purity manganese product manufacturing. With this project, the Czech Republic has the opportunity to position itself as the leading manganese producer in Europe. Furthermore, there is the potential to forge connections with regional vocational schools through internships, student part-time employment, or one-time company presentations, establishing a pathway for graduates to become potential job candidates.

Specifically, it can be mentioned that the parent company of Manganese Chvaletice, s.r.o. is listed on the stock exchange, which is a certain guarantee of transparency of activities in all phases (preparatory, construction, full operation) of the investment plan. Indirectly, this is a positive fact associated with the further development of the investment plan.

Adequate communication and cooperation with local residents, which began in 2018, as well as helpful responses from Mangan Chvaletice, s.r.o. to any suggestions and comments from the local community, will need to be sensitively maintained and further developed in all phases of the project.

To evaluate the social and economic impacts of the project, a separate study was also prepared (Květoň, et al., 2021, Annex No. 10).

Assessment of impacts in relation to regional and national economy

Influences on the economic environment in the region and the Czech Republic (economic relations, competitive environment)

The planned new plant for the production of high-purity manganese products will be located in a region/location with historically developed industrial production, where there has been a relatively low unemployment rate for a long time (not only in the current period showing unnaturally low unemployment throughout the Czech Republic).

With the planned number of employees, the new plant will be a medium-sized employer at the regional level, but it will be a major employer at the micro-regional level. Given the long-term high level of economic activity (i.e. employment) of the population in the entire micro-region, it is obvious that the new plant will increase competition among employers, which will lead to an improvement in the position of the workforce.

The economic benefits in the preparatory phase of the project are evident in the increase in turnover and orders in specialized companies and institutions, which provide the necessary background data, studies, surveys etc. Even in the present preparatory stage of the project, tangible economic benefits are evident for individuals, companies, or research teams involved.

The economic benefits in the construction phase will be particularly evident in the form of the implementation of supplies of building materials and related construction activities from regional suppliers, while the potential effects will be short-term and directly related to the total volume of funds.

According to the study, the economic effects in the phase of the launch of operations will be rather mediated (e.g. an increase in the foreign trade surplus) due to the expected orientation on exports, as the possibility of significant interconnection with domestic companies regularly purchasing manganese products is low in the current structure of the regional and national economy.

However, it can be added to the previous paragraph that the location of a battery production facility (so-called gigafactors) is currently being considered in the Czech Republic. In such a case, the ex-works production could also be consumed in the Czech Republic and the domestic economic effects would be more significant than assumed by Annex No. 10.

Impacts on the economic structure of the Chvaletice Industrial Zone

From the point of view of possible interaction on the labour market between companies in the EP Chvaletice industrial zone, it is necessary to point out that on the one hand, there is a danger consisting in insensitive recruitment of new workforce among the employees of existing companies located in this industrial zone, while in the medium term it is possible to expect an increasing number of cases where employees will leave the modern, but demanding three-shift operation and at the same time relatively easily find employment in other companies in the immediate vicinity.

Financial impact of the project on the affected municipalities

The mining fees in the municipalities of Chvaletice and Trnávka will represent a significant increase in regular income and will contribute in the long term to an increase in the investment activity of both municipalities and indirectly will be reflected in an increase in the quality of life (depending on the nature of the investments).

Assessment of the impact of the project in relation to employment and the situation on the labour market

The current situation on the labour market in the affected area is not very favourable for employers – there are many vacancies on the market, a low number of applicants and companies have only limited options for choosing employees.

The economic impacts in the preparatory phase are mainly associated with the creation of new jobs in Mangan Chvaletice s.r.o. and with a partial increase in wages and related statutory contributions for individuals/companies participating in preparatory analyses/studies and surveys.

However, a specific milestone in the preparatory phase and clear positive micro-regional impacts in the area of employment will certainly be the launch of the planned demonstration plant in the industrial area of EP Chvaletice, s.r.o., where, in addition to the existing production, there are free production halls and storage facilities.

The construction phase of the new plant in Chvaletice will mean a short-term intensive demand for labour in the micro-region and an increase in the turnover of local subcontractors from the field of construction, engineering and metalworking.

In the phase of full operation, the new plant will become a major employer at the local level and a medium-sized (large) employer at the regional level, offering a range of jobs requiring different qualifications.

The new plant will not only generate completely new jobs but will also cause the loss of jobs in selected companies in the EP Chvaletice industrial zone.

In connection with the import and export of raw materials, materials and manganese products, there will be a partial increase in demand among rail freight transport operators, but the impact on the associated employment will be minimal. Somewhat more significant will be the creation of secondary jobs as a result of the procurement of key raw materials for the processing process itself, i.e. sulphuric acid, hydrated lime and ammonium carbonate.

The speed of recruitment of new employees will be influenced by the set strategy in the area of wages and also by the economic cycle, in which the regional and national economy will be in the period of 6-10 months before the planned start of operations. The strong industrial tradition in the municipality of Chvaletice, as well as in the entire Přelouč municipality, implies the potential availability of at least part of the workers (although it is obvious that part of the workforce will be transferred from some existing companies).

The total number of inhabitants in the wider region of the planned plant has been increasing for a long time (an increase of about 4 thousand inhabitants over the last 18 years) due to the positive migration balance (especially people aged 20 – 40 years) and thus the amount of available labour force is expanding.

The number of foreigners on the labour market in the Pardubice District as well as the dynamics of the growth of new foreigners on the labour market is higher compared to the national average, and foreigners represent a significant part of the labour force, especially in industry. There are 1.8 thousand foreigners living in the Chvaletice region, but despite the considerable development of industry and the job opportunities associated with it, there is no significant increase in the number of foreigners compared to the average of the Czech Republic.

Average wages in the Pardubice Region are the 3rd lowest in the Czech Republic, but industrial enterprises pay higher average wages than in the region as a whole (however, there are relatively significant differences between individual branches of industry).

The current situation and future development of the number of economically active inhabitants and potential employees will not be a major problem in the region.

The social and economic effects can be assessed as **long-term and favourable**.

Influences associated with the change in transport services

The implementation of the assessed project does not require the construction of new transport infrastructure. The mining area will be connected to the II/322 road by means of the existing turn-off at the level of the tailings pond No. 2 (at approx. km 18.35 of the II/322 road). It is a turnoff to the local service road used to get to the village of Trnávka. After about 300 m from the turning from the II/322 road, the road leads directly to the area of the planned quarry facilities. The processing plant will be connected from the same road via an existing branch.

The actual transport of the extracted raw material to the processing plant and the return transport of mining waste does not require road or rail transport, it will be carried out over a technological bridge in the form of a pipeline (there) and a belt conveyor (back).

The import of volume – and weight-intensive commodities (lime, sulphuric acid) will be carried out by rail, as well as a larger part of the transport of finished products from the factory (part of the transport of manganese sulphate). Other transport, including the remainder of the expedition of pure manganese metal, will be carried out by road. In total, the project will generate approximately 206 passenger car trips, 15 light truck trips and 42 heavy truck trips per day in one direction. Freight traffic will be generated only during the daytime, which is also the reason why the draft measures in Chapter D.IV are formulated. Compared to the announcement of the intention, part of the dispatch of the finished products by road is now expected, but this is compensated by the fact that the import of soil for remediation and reclamation is not planned. These imports will be replaced by materials obtained during earthworks in the area of the plant.

An updated traffic study was prepared to assess the road connection of the plant (VACHTL, 2022; Annex No. 9) In the study, the resulting traffic intensity is assessed by a traffic model, assigned to the transport network and the outputs serve primarily as an input to the noise and dispersion study, and also for the capacity assessment of the II/322 intersection x special-purpose road to the production plant. Traffic intensities are documented in the form of simplified load cartograms, more detailed load was processed in tabular form for the entire documented network, including the day/night division.

The current state of 2022 and 3 prospective years are elaborated, further divided into project statuses:

- Current state of 2022 – situation on the existing network not affected by the planned project
- Prospective status 2025 – traffic during the construction of the project, prospective state with intent (SP) and without intent (BP),
- Outlook status 2028 – traffic during the operation of the project, prospective state with intent (SP) and without intent (BP),
- Outlook state 2043 – traffic during the operation of the project, distant prospective state with intent (SP) and without intent (BP).

The conclusion of the cited study states that all assessed states of the intersection will pass without any problems. This is primarily due to the not very high intensities on the II/322 continuous road, but also to the relatively low number of vehicles generated by the production plant itself.

The impacts associated with the change in transport services are evaluated as **insignificant** in the implementation of the measure consisting in the exclusion of road freight transport at night. This assessment can also be applied to construction.

The impacts on the noise situation and air quality associated with traffic are assessed in the relevant chapters.

In the period after remediation and reclamation, a mass visit to the area is not expected, even if part of it will be designated for recreation. Effects are evaluated as **insignificant**.

The project will generate an average of 1 block train per day, the impacts associated with the operation on the railway are evaluated as insignificant.

Impacts on recreational land use

The area of the current tailings and the immediate surroundings is used to a limited extent for recreational and leisure activities. This is an individual extensive use:

- off-road motorcycle rides (unofficial activity without the consent of the owners),
- hunting and hunting,
- fishing in the Elbe River.

Activities that take place directly in the area of exclusive deposits will be prevented, significantly limited or significantly hindered by the determination of the mining area. In particular, it will be motorcycle rides, which are probably carried out even today without the consent of the owners. In the case of hunting, activities could be maintained on the untouched part of the site and gradually restored on the reclaimed areas, but this will depend on the agreement between the local hunting association and the notifier.

The possibility of fishing in the adjacent section of the Elbe will not be affected in any way. With regard to the fact that seepage water from the tailings now flows into the Elbe, it is possible that the removal of this burden will also lead to improved conditions for fish development in the Elbe.

The construction of the planned cycle path Pardubice – Týnec nad Labem and the operation on it will not be negatively affected by the plan.

The plan will not affect other recreational activities associated with cultural and natural monuments in the wider area (e.g. the Stud Farm in Kladruby nad Labem). Mining in tailings cannot affect the number of visitors or the condition of this monument, which is evident from the noise and dispersion study as well as from the assessment of the impact on the landscape character.

With regard to the fact that some individual recreational activities in the area of interest affecting units of up to tens of people will be limited only marginally, the impact is evaluated as **insignificant** in the mining phase.

Separately, it is necessary to assess the impact in the post-remediation and reclamation phase. The proposal for remediation and reclamation is aimed at creating a diverse area with natural and recreational functions. From this point of view, the impact is evaluated as **potentially favourable**, with the specific possibilities of recreational activities to be specified in the next phases of the preparation of the plan.

2. Effects on air and climate

Impact on air quality

The dispersion study (Zambojová, 2022) evaluates the impact of mining in the proposed Trnávka DP and related activities on air quality. Emission sources are listed in Chapter B.III.1, the calculation of emissions in more detail in the dispersion study.

The SYMOS´97 program was used to model the contributions of air pollution concentrations of emitted pollutants in the mapped surroundings of the project, which enables the calculation of maximum hourly, daily and average annual air pollution concentrations.

Due to the pollution reserve of thousands of micrograms, no attention is paid to carbon monoxide in this assessment. Air pollution contributions from the project can be estimated at the level of units of micrograms, which is insignificant due to the air pollution background in the whole Czech Republic.

As part of this assessment, the pollution contribution of new emission sources is calculated, which is then compared with the values of the pollution background with the applicable pollution limits. Calculations of air pollution contributions of pollutants for which no pollution limits have been set are carried out as a basis for their assessment of impacts on public health in a separate follow-up study (Zemancová, 2022).

The dispersion study calculates the air pollution contributions of emitted pollutants for 3 model situations:

- Air pollution contributions of the operation in the least favourable stage of construction – at the time of the construction of the inter-depot located at the south-western end of the tailings near Chvaletice,
- Air pollution contributions of the operation of the project including both activities in the tailings area (extraction and preparation of raw materials) and operation of a new processing plant,
- Cumulative air pollution contributions of the project operation and increased unrelated car traffic on the surrounding road network.

The prospective year 2043 was chosen as a precautionary measure, given that in this prospective year the increase in traffic intensity is expected to be higher compared to the second model year 2028, for which traffic volumes are also quantified in the traffic study.

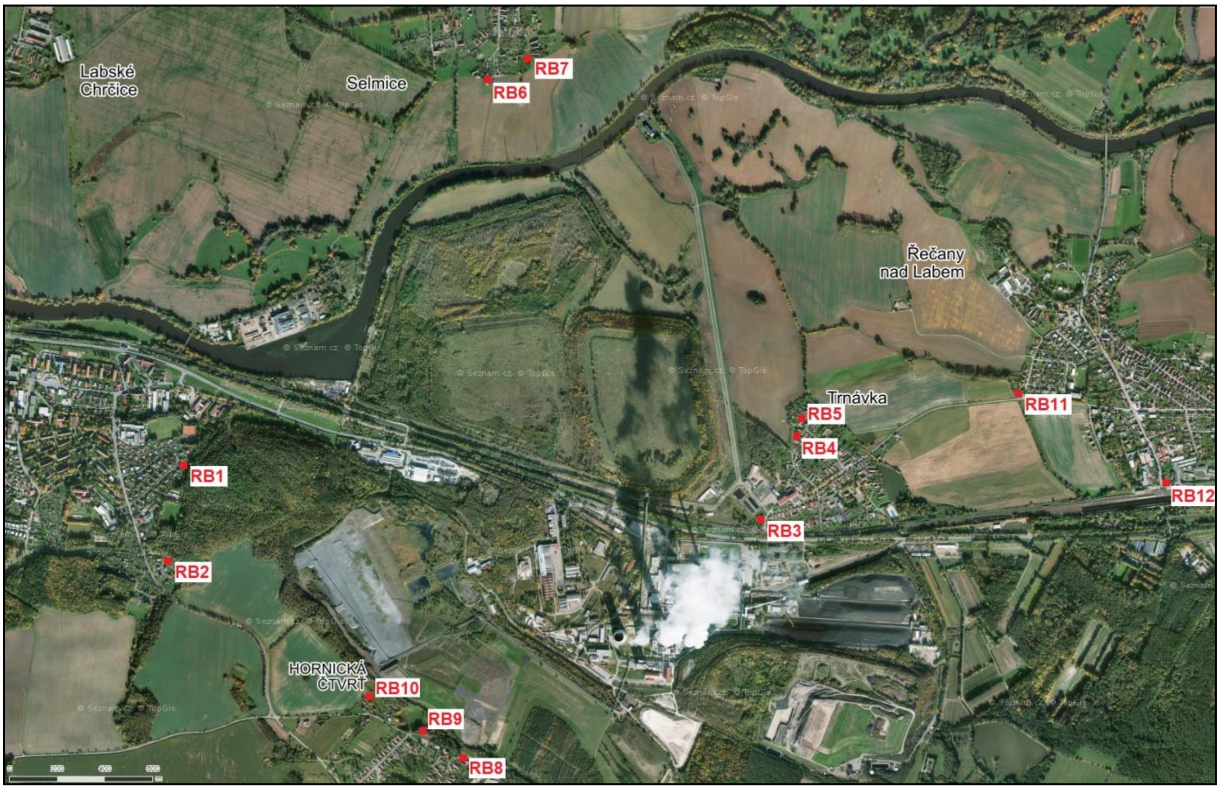
For the graphic sheet showing the air pollution field of the entire mapped site, the calculation was carried out in a detailed network with steps of 31 m in the direction of the X axis and 35 m in the direction of the Y axis, which includes 11374 reference points. The graphical outputs of the model air pollution situation express the determined air pollution contribution at a height of 1.5 m above the terrain (breathing zone).

In the chapter on the evaluation of air pollution contributions, the resulting air pollution concentrations are given at selected twelve reference points located in the places of the nearest residential development:

- Reference point 1 Palackého No. 207, Chvaletice – residential building
- Reference point 2 Pod Břízou No. 250, Chvaletice – residential building
- Reference point 3 Obránců míru No.91, Trnávka – residential building
- Reference point 4 V Ráji No. 59, Trnávka – residential building
- Reference point 5 V Ráji No. 112, Trnávka – residential building
- Reference point 6 Selmice No. 26 – residential building
- Reference point 7 Selmice No. 22 – family house
- Reference point 8 Hornická čtvrť No. 74 – residential building
- Reference point 9 Hornická čtvrť No. 75 – residential building
- Reference point 10 Hornická čtvrť No. 129 – residential building
- Reference point 11 351 Luční Street, Řečany nad Labem – family house
- Reference point 12 62 U Nádraží/1.máje Street, Řečany nad Labem – family house

The location of the reference points can be seen in the picture below (Picture No. 98).

Picture No. 98: Intent situation with the location of reference points for a dispersion study (Zambojová, 2022)



The calculation of air pollution contributions from the operation of the project was carried out for three model situations in which work is carried out in the part of the deposit that is located closest to the residential area. In the case of the residential area of Selmice, it is the northern edge of deposit 3 (situation further marked S1 – year 3), in the case of the residential development of Chvaletice, it is the south-western edge of deposit 1 (situation S2 – year 6) and in the case of Trnávka and Řečany nad Labem it is the south-eastern edge of deposit 2 (situation S3 – year 24).

Air pollution contributions of basic pollutants and their evaluation

In the following tables (Table No. 5 and Table No. 666) the resulting values of the contributions of the operation of the project consisting of the current operation in the area of the tailings and the operation of the processing plant to the concentrations of basic pollutants calculated at selected reference points located at the nearest residential areas in Trnávka, Chvaletice, Selmice, Hornická čtvrť and Řečany nad Labem are presented.

Table No. 95: Cumulative air pollution contributions of the project operation to the average annual concentrations of PM10, PM2.5 and NO2 in the nearest residential area

Reference point	PM_{10} ($\mu g/m^3$)			$PM_{2,5}$ ($\mu g/m^3$)			NO_2 ($\mu g/m^3$)		
	S1	S2	S3	S1	S2	S3	S1	S2	S3
1	0,020	0,048	0,023	0,015	0,033	0,015	0,084	0,122	0,091
2	0,013	0,025	0,017	0,010	0,018	0,011	0,062	0,081	0,071
3	0,093	0,106	0,235	0,082	0,091	0,151	0,298	0,314	0,472
4	0,049	0,060	0,238	0,039	0,047	0,131	0,171	0,187	0,403
5	0,047	0,057	0,207	0,037	0,044	0,114	0,162	0,176	0,360
6	0,114	0,051	0,039	0,070	0,036	0,023	0,193	0,121	0,117
7	0,091	0,045	0,035	0,056	0,032	0,021	0,163	0,110	0,107
8	0,008	0,012	0,012	0,006	0,009	0,008	0,045	0,052	0,054
9	0,009	0,013	0,014	0,007	0,010	0,009	0,051	0,057	0,060

Reference point	PM_{10} ($\mu g/m^3$)			$PM_{2,5}$ ($\mu g/m^3$)			NO_2 ($\mu g/m^3$)		
	S1	S2	S3	S1	S2	S3	S1	S2	S3
10	0,010	0,015	0,016	0,008	0,011	0,011	0,057	0,064	0,068
11	0,023	0,025	0,044	0,017	0,019	0,026	0,095	0,099	0,128
12	0,014	0,016	0,024	0,010	0,012	0,015	0,070	0,075	0,089
MIN	**0,008**	**0,012**	**0,012**	**0,006**	**0,009**	**0,008**	**0,045**	**0,052**	**0,054**
MAX	**0,114**	**0,106**	**0,238**	**0,082**	**0,091**	**0,151**	**0,298**	**0,314**	**0,472**

Table No. 666: Cumulative air pollution contributions of the project operation to the maximum short-term concentrations of PM10 and NO2 and to the average annual concentrations of benzene and benzo(a)pyrene in the places of the nearest residential area

RP	PM_{10} ($\mu g/m^3$) Maximum Daily			NO_2 ($\mu g/m^3$) Maximum Hourly			Bzn ($\mu g/m^3$)	BaP (ng/m^3)
	S1	S2	S3	S1	S2	S3	Average annual	Average annual
1	2,79	4,08	2,37	4,93	5,99	5,32	0,00008	0,00006
2	2,38	3,66	2,34	4,53	5,72	5,54	0,00005	0,00003
3	2,64	2,99	7,06	4,56	5,09	9,20	0,00065	0,00042
4	2,64	2,80	9,49	4,53	4,82	13,30	0,00029	0,00018
5	2,65	2,78	8,21	4,54	4,80	11,81	0,00026	0,00017
6	6,53	4,21	2,17	9,37	6,77	4,83	0,00008	0,00005
7	6,41	3,72	2,15	8,99	6,20	4,68	0,00007	0,00005
8	2,28	3,81	2,91	4,69	6,51	6,53	0,00004	0,00002
9	2,39	4,16	2,96	4,77	6,88	6,89	0,00004	0,00002
10	2,48	4,52	3,08	4,76	7,19	6,71	0,00005	0,00003
11	1,76	1,82	3,62	3,83	3,82	7,04	0,00020	0,00013
12	1,33	1,46	2,41	4,55	4,53	5,32	0,00039	0,00026
MIN	**1,33**	**1,46**	**2,15**	**3,83**	**3,82**	**4,68**	**0,00004**	**0,00002**
MAX	**6,53**	**4,52**	**9,49**	**9,37**	**7,19**	**13,3**	**0,00065**	**0,00042**

The following table shows the range of air pollution contributions determined in the calculation for the graphic output, which was calculated in a dense network of reference points covering the surroundings of the project, including the tailings area and the processing plant. The range of air pollution contributions is the same for all 3 variants, only the location of the maxima in the tailings area differs. A graphical representation is shown in the breakdown study.

Table No. 677: Range of resulting air pollution contributions of the project operation to the concentrations of basic pollutants in the mapped surroundings

	NO_2 ($\mu g/m^3$)		PM_{10} ($\mu g/m^3$)		$PM_{2,5}$ ($\mu g/m^3$)	Bzn ($\mu g/m^3$)	BaP (ng/m^3)
	Average annual	Maximum Hourly	Average annual	Maximum Daily	Average annual	Average annual	Average annual
MIN	0	3	0	1	0	0	0
MAX	0,8	14,0	0,8	14	0,4	0,0016	0,0011

The dispersion study also calculated cumulative air pollution contributions to 2043 caused not only by the operation of the project, but also by increased car traffic on the surrounding road network. An increase in traffic intensity in the model year 2043 is expected regardless of the implementation of the plan. The calculation of these cumulative pollution contributions for 2043 includes the operation of the project and increased traffic compared to the present (the difference in traffic intensity in 2043 including the intention and traffic intensity in 2022). The resulting values of these cumulative air pollution contributions are shown in the following table:

Table No. 98: Cumulative air pollution contributions of the project operation and increased traffic as of 2043

Reference point	NO_2 (μg/m³)		PM_{10} (μg/m³)		$PM_{2,5}$ (μg/m³)	Benzen (μg/m³)	BaP (ng/m³)
	Average annual	Maximum Hourly	Average annual	Maximum Daily	Average annual	Average annual	Average annual
1	0,095	5,38	0,028	2,46	0,019	0,00028	0,00021
2	0,073	5,57	0,019	2,39	0,013	0,00014	0,00010
3	0,484	9,20	0,261	7,06	0,170	0,00173	0,00124
4	0,407	13,34	0,246	9,55	0,137	0,00076	0,00054
5	0,364	11,83	0,214	8,25	0,119	0,00069	0,00049
6	0,120	4,85	0,042	2,19	0,025	0,00022	0,00016
7	0,109	4,70	0,038	2,17	0,023	0,00021	0,00015
8	0,055	6,55	0,013	2,93	0,009	0,00009	0,00006
9	0,061	6,91	0,015	2,99	0,010	0,00010	0,00007
10	0,069	6,73	0,017	3,11	0,012	0,00011	0,00008
11	0,130	7,08	0,046	3,66	0,028	0,00056	0,00040
12	0,091	5,39	0,025	2,48	0,016	0,00110	0,00080
MIN	**0,055**	**4,7**	**0,013**	**2,17**	**0,009**	**0,00009**	**0,00006**
MAX	**0,484**	**13,34**	**0,261**	**9,55**	**0,17**	**0,00173**	**0,00124**

In the following table (Table No. 68) the range of cumulative air pollution contributions of the operation of the project and increased unrelated car traffic on the surrounding road network determined in the calculation for the graphic output, which was calculated in a dense network of reference points covering the surroundings of the plant, including the plant premises itself, is stated.

Table No. 689: Range of the resulting cumulative air pollution contributions of the project operation and increased unrelated car traffic in the mapped vicinity

	NO_2 (μg/m³)		PM_{10} (μg/m³)		$PM_{2,5}$ (μg/m³)	Bzn (μg/m³)	BaP (ng/m³)
	Average annual	Maximum Hourly	Average annual	Maximum Daily	Average annual	Average annual	Average annual
MIN	0	3	0	1	0	0	0
MAX	0,8	14	0,8	14	0,4	0,0022	0,0016

The results and graphical outputs show that the air pollution contributions to the concentrations of nitrogen dioxide and particulate matter from the operation of the project optically overlap the air pollution contributions from increased unrelated transport. The range of air pollution contributions caused only by the operation of the project and the cumulative operation of the project and increased unrelated traffic is identical to the maxima directly in the area of the processing plant and in the area of the tailings. The resulting range of values of air pollution contributions is identical in the variant of the isolated contribution of the operation of the project and the cumulative contribution of the operation of the project and increased unrelated transport.

The following table summarizes the evaluation of the air pollution contributions of the project operation to the average annual concentrations of emitted pollutants cumulatively with the values of concentrations of individual pollutants in the air pollution background and a comparison of the resulting values with the valid pollution limits. In accordance with the requirements of the Air Protection Act, the values of concentrations in the air pollution background are taken from the map of air pollution prepared for moving five-year averages of concentrations, and the map for the five-year period 2017 to 2021 is currently published. The air pollution contributions of existing emission sources in the mapped area are already included in the concentrations listed in the map. The operation of the KASI Foundry and the Chvaletice Asphalt Plant, which were put into operation only in 2019, can theoretically have an impact on the air pollution concentrations in the air pollution background. The map of air pollution prepared for moving averages of pollutant concentrations for the years 2017 to 2021 does not theoretically include the operation of these sources completely. For the cumulative assessment of the operation of the project with concentrations in the pollution background, the resulting air pollution contributions of the Chvaletice Foundry and the Chvaletice Asphalt Plant were also used, taken over from the dispersion studies prepared for these constructions within the environmental impact assessment according to Act 100/2001 Coll. Specifically, it is a dispersion study prepared for the project "Production Plant – KASI Chvaletice Foundry (Chvaletice Industrial Zone)", EPMPLA AG spol. s r.o., February 2016 and a dispersion study for the project "Asphalt mixing plant of the company Bauset – Chvaletice" in October 2015 (processor RNDr. Tomáš Bajer, CSc., Ing. Martin Šára, Ing. Jana Bajerová, ECO-ENVI-CONSULT, Jičín). In the following table, in the row "Total after implementation at most", the value of the highest cumulative air pollution contribution of the project and increased unrelated traffic is added to the highest values of the air pollution contributions of the Chvaletice Asphalt Plant and the KASI Foundry and to the highest value of the concentration of the relevant pollutant in the air pollution background according to the air pollution map.

Table No. 100 Summary and evaluation of air pollution contributions to average annual concentrations from plant operation

	NO_2 (µg/m^3)	PM_{10} (µg/m^3)	$PM_{2,5}$ (µg/m^3)	Benzen (µg/m^3)	BaP (ng/m^3)
Air pollution background	max. 10,8	max. 21,3	max. 15,2	max. 0,8	0,9
the highest air pollution contribution of the project	0,8	0,8	0,4	0,0016	0,0011
Cumulative contribution of the project and increased unrelated traffic	0,8	0,8	0,4	0,0022	0,0016
Air pollution contribution of the Chvaletice asphalt plant	0,033	0,12	0,034	0,0033	0,0016
Air pollution contribution of the KASI foundry	0,0099	2,22	1,64	0,0005	0,0011
A total with an intention of no more than	11,6429	24,44	17,274	0,806	0,9043
IM limit value	40	40	20	5	1
Proportion of the pollution limit value (%)	**29,1**	**61,1**	**86,4**	**16,1**	**90,4**

The table shows that the operation of the project will not cause exceeding the pollution limits for average annual concentrations of nitrogen dioxide, particulate matter of PM10 or PM2.5, benzene or benzo(a)pyrene, either in cumulation with increased unrelated car traffic, in cumulation with the operation of the Chvaletice Asphalt Plant or in cumulation with the operation of the KASI foundry. On the basis of the air pollution map prepared for five-year moving averages, reliable compliance with the applicable pollution limits for the annual average of all these pollutants can be expected against the pollution background.

The evaluation of air pollution contributions to short-term maximum concentrations encounters a problem, which lies in the fact that the values of air pollution contributions cannot be easily added to the values of maximum short-term concentrations in the air pollution background.

Based on the results of air pollution measurements in the Czech Republic, the resulting background first maximum hourly air pollution concentration of NO_2 can be expected at a level below 150 µg/m3 at the investigated location. The maximum hourly air pollution concentrations can thus be expected to be safely below the limit value set at 200 µg/m3. Maps of five-year averages prepared by the Czech Hydrometeorological Institute do not include hourly maximum nitrogen dioxide. In recent years, the pollution limit value for the hourly maximum NO2 has been met at all air pollution stations in the Czech Republic.

According to the results of the model calculation, the values of air pollution contributions of the operation of the assessed project range from 3 to 14 µg/m3 in the entire mapped locality, including the plant and mining area itself, and in the range of 4 to 13 µg/m3 for residential development. These values are safely lower than the limit value. These are theoretically the worst possible situations, when the least favourable dispersion conditions are combined with the maximum possible emission and wind direction, which may not occur in a given year.

The maximum values of air pollution contributions are achieved mainly on the premises of the plant and at the mining site.

It can be assumed that the air pollution contribution of the project operation to the maximum hourly concentrations of nitrogen dioxide below 14 µg/m3 in the vicinity of the project will not cause the limit for the hourly maximum of NO2, which is set at 200 µg/m3, together with the pollution background, which can be expected in this case to be up to 150 µg/m3. In addition, it is sufficient to meet the pollution limit value if the 19th highest hourly pollution in the year meets its value.

In the case of maximum daily concentrations of PM10 according to the map of moving five-year averages of air pollution concentrations, the 36th highest daily air pollution concentration of PM10 in the last five years is at the level of 34.0–37.0 µg/m3, i.e. below the limit value set for this 36th highest daily concentration of PM10 at 50.0 µg/m3.

The cumulative air pollution contribution of the operation of the assessed project given by the operation of both the processing plant and the operation of the tailings area, where the extraction and preparation of the raw material takes place, to the maximum daily PM10 pollution ranges from 1 to 14 µg/m3 in the area under the least favourable conditions in the area in question, and in the range of 1 to 9 µg/m3 in residential areas. These values are also safely lower than the limit value.

It can be assumed that the air pollution contribution of the project operation to the maximum daily concentrations of PM10 at a level below 15 µg/m3 will not cause the limit for the daily maximum of PM10, which is set at 50 µg/m3, together with the pollution background, which can be expected in this case to be in the range of 34 to 37 µg/m3. The values of air pollution contributions to short-term maximum concentrations cannot be simply added to the values of maximum concentrations in the air pollution background.

The days on which the overburden will be handled should be chosen so that it is a dyne with a low risk of excessive dust. Overburden will thus be carried out outside the dry and windy periods, which is also how the measures in Part D.IV are formulated.

Air pollution contributions to H_2SO_4, NH_3, H_2S and Mn concentrations

The technological process of the processing plant will also produce emissions of sulphuric acid, hydrogen sulphide, ammonia and manganese fumes. For these pollutants, there are no limit values with which the resulting concentrations could be compared. The calculation of these air pollution contributions within the dispersion study was carried out as a basis for a separate study of the impacts on public health, in which these air pollution contributions will be evaluated. In the following tables (Table No. 691 and Table No. 2) the values of these contributions are given in the places of the nearest and most exposed residential development.

Table No. 691: Air pollution contributions of technological sources to H concentrations$_{2SO4}$ and NH3 in the nearest residential area (µg/m$_3$)

RP	H_2SO_4 (µg/m^3)			NH_3 (µg/m^3)		
	Maximum Hourly	**Maximum Daily**	**Average Annual**	**Maximum Hourly**	**Maximum Daily**	**Average Annual**
RB 1 Palackého No. 207, Chvaletice	0,043	0,034	0,00053	0,53	0,44	0,0062
RB 2 Pod Břízou No. 250, Chvaletice	0,042	0,034	0,00037	0,48	0,39	0,0047
RB 3 Obránců míru No.91, Trnávka	0,052	0,041	0,00095	0,47	0,37	0,0137
RB 4 V Ráji No. 59, Trnávka	0,046	0,036	0,00071	0,37	0,30	0,0095
RB 5 V Ráji No. 112, Trnávka	0,044	0,035	0,00068	0,36	0,28	0,0089
RB 6 Selmice No. 26	0,031	0,025	0,00031	0,31	0,25	0,0037
RB 7 Selmice No. 22	0,031	0,025	0,00028	0,29	0,24	0,0033
RB 8 Hornická čtvrť No. 74	0,061	0,049	0,00029	0,55	0,44	0,0047
RB 9 Hornická čtvrť No. 75	0,064	0,051	0,00036	0,56	0,45	0,0053
RB 10 Hornická čtvrť No. 129	0,063	0,050	0,00042	0,53	0,42	0,0060
RB 11 Luční No. 351 Řečany n/L	0,030	0,024	0,00035	0,26	0,22	0,0044
RB 12 U Nádraží No. 62, Řečany n/L	0,026	0,021	0,00026	0,28	0,23	0,0032
MIN	**0,026**	**0,021**	**0,00026**	**0,26**	**0,22**	**0,0032**
MAX	**0,064**	**0,051**	**0,00095**	**0,56**	**0,45**	**0,0137**

Table No. 102: Air pollution contributions of the project operation to the end of manganese and H2S in the nearest residential area (µg/m3)

RP	Mn (µg/m^3)			H_2S (µg/m^3)		
	Maximum Hourly	**Maximum Daily**	**Average Annual**	**Maximum Hourly**	**Maximum Daily**	**Average Annual**
RP 1 Palackého No. 207, Chvaletice	0,025	0,021	0,00057	0,059	0,046	0,00077
RP 2 Pod Břízou No. 250, Chvaletice	0,027	0,022	0,00041	0,060	0,047	0,00056
RP 3 Obránců míru No.91, Trnávka	0,047	0,037	0,00163	0,080	0,063	0,00143

RP	**Mn ($\mu g/m^3$)**			**H_2S ($\mu g/m^3$)**		
	Maximum Hourly	**Maximum Daily**	**Average Annual**	**Maximum Hourly**	**Maximum Daily**	**Average Annual**
RP 4 V Ráji No. 59, Trnávka	0,044	0,037	0,00124	0,070	0,055	0,00103
RP 5 V Ráji No. 112, Trnávka	0,045	0,038	0,00118	0,068	0,053	0,00097
RP 6 Selmice No. 26	0,042	0,034	0,00067	0,047	0,037	0,00043
RP 7 Selmice No. 22	0,045	0,037	0,00058	0,046	0,036	0,00039
RP 8 Hornická čtvrť No. 74	0,062	0,051	0,00034	0,094	0,074	0,00050
RP 9 Hornická čtvrť No. 75	0,064	0,053	0,00038	0,098	0,077	0,00060
RP 10 Hornická čtvrť No. 129	0,054	0,044	0,00045	0,099	0,078	0,00069
RP 11 Luční No. 351 Řečany n/L	0,037	0,030	0,00058	0,049	0,038	0,00049
RP 12 U Nádraží No. 62, Řečany n/L	0,032	0,026	0,00041	0,041	0,032	0,00036
MIN	**0,025**	**0,021**	**0,00034**	**0,041**	**0,032**	**0,00036**
MAX	**0,064**	**0,053**	**0,00163**	**0,099**	**0,078**	**0,00143**

In the following tables (Table No. 3 and Table No. 4) the range of air pollution contributions determined in the calculation for the graphic output, which was calculated in a dense network of reference points covering the immediate surroundings and the area of the project itself, is stated.

Table No. 103: Range of resulting air pollution contributions of H2SO4 and NH3 in the vicinity of the plant (µg/m3)

	H_2SO_4 ($\mu g/m^3$)			**NH_3 ($\mu g/m^3$)**		
	Maximum Hourly	**Maximum Daily**	**Average Annual**	**Maximum Hourly**	**Maximum Daily**	**Average Annual**
MIN	0,02	0,01	0	0,2	0,1	0
MAX	0,1	0,08	0,0025	1,0	0,9	0,05

Table No. 104: Range of resulting immission contributions of H2S and manganese in the vicinity of the plant (µg/m3)

	H_2S ($\mu g/m^3$)			**Mn ($\mu g/m^3$)**		
	Maximum Hourly	**Maximum Daily**	**Average Annual**	**Maximum Hourly**	**Maximum Daily**	**Average Annual**
MIN	0,03	0,02	0	0,02	0,01	0
MAX	0,14	0,12	0,004	0,1	0,08	0,004

Evaluation of odour effects

Ammonia

Within the dispersion study, it is possible to evaluate the air pollution contributions to ammonia concentrations in terms of the odour effect of this pollutant.

The perception of odours is very individual, and the olfactory thresholds are therefore determined in various literature in a relatively wide range of 0.03 to 72 mg/m3, i.e. 30 to 72,000 µg/m3. Modelling of odour substances is problematic due to the fact that immediate fluctuations in the concentrations of these substances are decisive, the sensory perception of odour is very fast and takes place in fractions of a second. Commonly available dispersion models calculate at most the maximum hourly average. However, experience with the dispersion model shows that these results represent rather peak – overestimated values and can therefore be used for this evaluation with a certain awareness of limitations.

Air pollution contributions to the maximum hourly ammonia concentrations range from 0.2 to 1.0 μg/m3 in the mapped locality and in the range of 0.4 to 0.6 μg/m3 in the nearest residential area. The graphic appendix shows that outside the plant premises, the values of air pollution contributions to hourly maximum ammonia are below 0.8 μg/m3.

The values of air pollution contributions to the maximum hourly ammonia concentrations outside the plant premises of a maximum of 0.8 μg/m3 are significantly lower than the lowest reported value of the olfactory threshold of ammonia, i.e. 30 μg/m3.

The stated air pollution reserve appears to be sufficient for the influence of an unknown air pollution background.

Hydrogen sulphide

The olfactory threshold of hydrogen sulphide is given in various literature, again in a relatively wide range of 0.7 to 180 μg/m3.

Air pollution contributions to the maximum hourly concentrations of hydrogen sulphide are below 0.14 μg/m3 in the mapped locality, and in the vicinity of residential areas in the range of 0.05 to 0.1 μg/m3. The graphic appendix shows that outside the plant premises, the values of air pollution contributions to hourly maximum hydrogen sulphide are below 0.12 μg/m3.

The values of air pollution contributions to the maximum hourly concentrations of hydrogen sulphide outside the plant premises of a maximum of 0.12 μg/m3 are significantly lower than the lowest reported value of the hydrogen sulphide olfactory threshold, i.e. 0.7 μg/m3.

The stated air pollution reserve appears to be sufficient for the influence of an unknown air pollution background.

Construction period

The most important pollutants emitted during the construction phase are dust particles. The calculation of air pollution contributions of activities in the construction phase is carried out for maximum daily concentrations of PM10 and average annual concentrations of PM10 and PM2.5.

In the following table (Table No. 5) the values of air pollution contributions to PM10 and PM2.5 concentrations calculated for the nearest residential area are given.

Table No. 105: Air pollution contributions in the phase of construction of inter-depot to PM10 and PM2.5 concentrations

RP	PM_{10} (μg/m^3)		$PM_{2,5}$ (μg/m^3)
	Average Annual	Maximum Daily	Average Annual
RP 1 Palackého No. 207, Chvaletice	0,20	26,2	0,038
RP 2 Pod Břízou No. 250, Chvaletice	0,12	24,9	0,024
RP 3 Obránců míru No.91, Trnávka	0,27	32,4	0,053
RP 4 V Ráji No. 59, Trnávka	0,26	26,5	0,048
RP 5 V Ráji No. 112, Trnávka	0,25	25,8	0,047

RP	**PM_{10} (µg/m³)**		**$PM_{2,5}$ (µg/m³)**
	Average Annual	**Maximum Daily**	**Average Annual**
RP 6 Selmice No. 26	0,19	14,1	0,034
RP 7 Selmice No. 22	0,17	13,5	0,030
RP 8 Hornická čtvrť No. 74	0,06	21,2	0,011
RP 9 Hornická čtvrť No. 75	0,07	21,9	0,013
RP 10 Hornická čtvrť No. 129	0,08	22,4	0,015
RP 11 Luční No. 351, Řečany n.L.	0,10	17,7	0,020
RP 12 U nádraží No. 62, Řečany n.L.	0,07	14,2	0,013
MIN	**0,06**	**13,5**	**0,011**
MAX	**0,27**	**32,4**	**0,053**

In the following table (Table No. 6) is clearly evaluated by the pollution contributions in the construction phase to the average annual concentrations of emitted pollutants cumulatively with the values of the pollution background and the comparison of the resulting values with the valid air pollution limits. The construction of the intermediate landfill, together with the field work in the area of the processing plant, represents the least favourable stage of the construction in terms of dust generation. In the following table, in the row "total with the intention of the maximum", the value of the highest air pollution contribution is added to the highest value of the air pollution background according to the air pollution map prepared for five-year averages of monitored pollutants.

Table No. 106: Summary and evaluation of air pollution contributions in the construction phase to the average annual PM concentrations (µg/m3)

	PM_{10} (µg/m³)	**$PM_{2,5}$ (µg/m³)**
Air pollution background (2017–2021)	max. 20,6	max. 15,2
Highest air pollution contribution	0,27	0,053
A total with an intention of no more than	20,87	15,253
IM limit value	40	20
Proportion of the pollution limit value (%)	**52,2**	**76,3**

The table shows that activities in the construction phase will not cause the pollution limits for average annual concentrations of particulate matter of PM10 or PM2.5 fraction to be exceeded.

The evaluation of air pollution contributions to short-term maximum concentrations encounters a problem, which lies in the fact that the values of air pollution contributions cannot be easily added to the values of maximum short-term concentrations in the air pollution background.

In the case of maximum daily concentrations of PM10 according to the map of moving five-year averages of air pollution concentrations, the 36th highest daily air pollution concentration of PM10 in the last five years is at the level of 34 to 37 µg/m3, i.e. well below the limit value set for this 36th highest daily concentration of PM10 at 50.0 µg/m3.

The air pollution contributions of construction activities in the construction phase to the maximum daily PM10 emissions range at levels of 13.5 to 32.4 µg/m3 in the places closest and most exposed to residential development under the least favourable conditions. This is theoretically the highest air pollution contribution that could occur during the year. Experience with the dispersion model shows that the resulting maximum values (hourly and daily maxima) should be viewed as peak values, which reflect the theoretically worst possible situation. They are calculated for the worst phase of operation and may not occur under the least favourable dispersion conditions and wind direction.

These are relatively high values, which can be described as well acceptable due to the time limitations of the construction stage.

In conclusion, the author of the dispersion study states that the process of obtaining the raw material and its preparation taking place in the tailings area is mainly associated with nitrogen oxide emissions from mining mechanization engines and technological emissions of dust particles. The total annual emission flux of nitrogen oxides from mining mechanization engines is about 14 t/year. These relatively high emissions of nitrogen oxides from diesel engines are associated with the high combustion temperature of these sources. The total expected annual mass flux of PM10 dust particles is about 1 t/year and the emission flux of PM2.5 particles is about 0.6 t/year. These relatively favourable emission values result from the high humidity of the extracted material and are mainly due to overburden and reclamation. Emissions of benzene and benzo(a)pyrene from generated transport can be described as relatively very low.

The operation of the new production processing plant is associated with the emergence of new technological sources of emissions. With the highest emission flux of approx. 45.7 tonnes per year, nitrogen oxides will be emitted from the operation of the processing plant. The dominant source of emissions is a thermal source using hydrogen and natural gas as fuel, as well as rail transport. With an emission flux of about 0.95 t/year, particulate matter of the PM10 fraction will be emitted, the emission flux of particles of the lower fraction of PM2.5 is expected at the level of 0.91 t/year, the emission flux of ammonia is 0.54 t/year. The emission flux of sulphuric acid is expected to be about 54 kg/year and the hydrogen sulphide emission flux is expected to be about 68 kg/year due to the installation of scrubbers. Manganese alone is expected to be 69.7 kg/year. Emissions of benzene and benzo(a)pyrene from generated car traffic can be described as insignificant.

On the basis of the air pollution map, or on the basis of the results of air pollution measurements in the Czech Republic, reliable compliance with the valid pollution limits for the average annual and short-term maximum concentrations of all emitted pollutants, i.e. NO2, PM10, PM2.5, benzene and benzo(a)pyrene, can be expected in the locality.

Overall, from the point of view of air impacts, it can be stated that the project "Recycling of the Chvaletice – Trnávka tailings", even in cumulation with increased unrelated car traffic and the operation of the Chvaletice Asphalt Plant, will not cause the applicable pollution limits of all emitted pollutants to be exceeded in the construction and operation phases. The intention "Recycling of the Chvaletice – Trnávka tailings" can be described as acceptable in terms of its impact on the atmosphere.

In the dispersion study and also in this documentation in Chapter D.IV., a number of measures are listed to prevent, minimise, or compensate for the effects on air quality.

The impact on the quality of air is evaluated as **insignificant** in the construction phase and in the operation phase, also due to the effect of odour substances.

Change in microclimate

The mining intention will be carried out in an area currently overgrown with herbaceous vegetation and in part of the territory also woody plants. This vegetation will be continuously removed and returned after remediation and reclamation. As a result of the removal of vegetation, there will be a local change in the microclimate. A surface without vegetation is characterized by less thermal stability and lower humidity.

The occupation process is divided into 25 annual sections. The area of the area without vegetation will change as mining progresses, but it should not exceed 25% of the total area. This factor will fundamentally mitigate the effects of microclimate change in the context of the entire mining area.

After the completion of the remediation and reclamation, a micro-basin will be created, inclined slightly towards the central part with a dry polder with a permanent occurrence of wetlands and pools. From the point of view of the impact on the microclimate, this procedure can be evaluated positively. There will also be some retention of rainwater in the landscape.

Woody vegetation will also be felled in the area of the processing plant. Therefore, it can be assumed that there will be a local change in the microclimate manifested by lower humidity and lower thermal stability. This will be compensated to some extent by the evaporation of water during cooling. However, compared to the evaporation of water from the cooling towers of the Chvaletice power plant, this phenomenon will be negligible in the context of the wider area. Changes in the microclimate will be reflected only in the area of the plant, this effect will not reach the residential development. In addition, the processing plant is separated from the built-up area of Chvaletice by extensive stands of woody plants, which will be preserved.

Overall, the impact is assessed as **insignificant**.

Impact on climate

Climate change containment

Climate Protection Policy in the Czech Republic (2017) replaces the National Programme for Mitigation of the Effects of Climate Change in the Czech Republic from 2004. It defines the main objectives and measures in the area of climate protection at the national level to ensure the fulfilment of greenhouse gas emission reduction targets in relation to obligations arising from international agreements (the United Nations Framework Convention on Climate Change and its Kyoto Protocol, the Paris Agreement and obligations arising from European Union legislation). This strategy in the field of climate protection until 2030, with a view to 2050, should thus contribute to the long-term transition to a sustainable low-emission economy of the Czech Republic.

Climate protection policy in the Czech Republic focuses on the period from 2017 to 2030 with a view to 2050. Its implementation will be evaluated by the end of 2021 and an update of the Climate Protection Policy in the Czech Republic is scheduled by the end of 2023 following a review of commitments under the Paris Agreement.

The document shows that the European Union's economy (GDP) grew by 46% between 1990 and 2014, while its emissions intensity (the amount of emissions per unit of GDP) fell by almost half. This decoupling of economic growth from growth in emissions has taken place in all Member States. The energy intensity of industry in the EU fell by almost 19% between 2001 and 2011. Industrial processes are the third largest source of greenhouse gas emissions, after energy and agriculture, accounting for around seven per cent of the Union's total emissions.

According to the Roadmap for moving to a competitive low-carbon EU economy in 2050, emissions in this sector should gradually fall by up to 80% by mid-century.

The 2010 Strategic Framework for Sustainable Development of the Czech Republic cites as weaknesses of the Czech industry, in particular, the high share of energy-intensive production, dependence on imports of raw materials, vulnerability to oil prices, growing global competition (new markets) and also the slow transformation of the traditional sectoral structure. The energy intensity of production, recalculated for the same structure of the industrial sector, is about 10% higher than the average of the old EU Member States. The share of industry (including the energy sector) in the Czech Republic is approximately 30% of gross value added, making the Czech Republic one of the most industrialized EU Member States. A large share in the Czech Republic is accounted for by heavy industry such as metallurgy or engineering. This fact is amplified by the country's location in Europe, which makes the Czech Republic a transit country.

Part of industrial emissions comes from industrial processes (oxidation, calcination, hydrogen production etc.), which are determined by the nature of production processes and depend only on the volume of production. The second part of direct industrial emissions comes from plant power generation, i.e. the production of electricity and process steam used in production processes. There is significant room for reducing the consumption of heat and electricity in production technologies, for example, by means of heat recovery, the introduction of combined production of electricity, heat and cold (trigeneration), speed control of industrial engines, modernization of electromechanical equipment etc. Measures in the industrial production sector should therefore contribute to the stabilisation of direct greenhouse gas emissions from industrial processes and to the reduction of indirect emissions from electricity and heat consumption.

The Roadmap for moving to a competitive low-carbon EU economy in 2050 set out gradual, cost-effective steps towards an overall reduction in emissions of 80% by mid-century compared to 1990. Emissions in the industrial sector are expected to fall by up to 80%. The plan envisages the use of increasingly cleaner and more efficient technologies and, after 2035, the application of carbon capture and storage (CCS) technology in those areas of industry (e.g. steel and cement production) where emissions cannot be reduced in any other way. Non-CO2 greenhouse gas emissions (in particular N2O for industrial chemical production, methane CH4 and HFC/PFC hydrofluorocarbons) are also expected to fall significantly, which are covered by the EU ETS (European Greenhouse Gas Emissions Trading System).

Climate protection policy in the Czech Republic states that most of the policies and measures related to the industrial sector are included in the chapter on cross-cutting measures, some in the chapters on energy and final energy consumption (mainly measures 1A, 2A, 3A, 4A, 1D and 2D):

(1A) Taxation of emissions outside the EU ETS (introduction of a carbon tax)

(2A) Effective implementation of the EU ETS after 2020

(3A) Investment priorities related to the EU ETS post-2020

(4A) EU ETS indirect cost compensation scheme

1D) Support for the priority implementation of measures to reduce energy intensity in the energy sector and industry.

(2D) Supporting the implementation of measures to reduce energy consumption, increase energy efficiency and use low-emission and renewable energy sources

From the above, it is clear that measures No. 1A, 2A, 3A and 4A are purely economic and, after their implementation, will also apply to the notifier, but only partially in the changed structure of energy costs. In principle, they can also mean an increase in the prices of production in the quarry.

Measures 1D and 2D are relevant in terms of the need to reduce energy intensity.

When designing the project, the issue of energy performance was a priority. The location of the project near a significant source of heat, which would become waste heat, was also used. Thermal energy for the process and heating of the buildings will be supplied in the form of superheated water from the Chvaletice power plant.

Nevertheless, the implementation of the project represents a new source of greenhouse gases, specifically CO2 from several sources:

- mechanization in the quarry,
- intra-site transport,
- out-of-campus transport,
- operation of siding,
- stationary sources of CO2 emissions within the raw material processing process,
- combustion of natural gas for some processes.

An estimate of CO2 emissions is provided in Chapter B.II.1. The total emissions from diesel combustion are expected to be about 2,700 tonnes per year. From the point of view of means of transport and mining mechanisms, a usable replacement for trucks and mechanization with lower CO2 production has not yet been developed, but the use of new machines with high efficiency and thus low fuel consumption and CO2 production is expected. However, the analysis of the availability of adequate mechanization of similar performance parameters has so far ruled out the massive deployment of electrical equipment (dumpers, excavators etc.). It is extremely difficult to draw conclusions for global climate change from the value of oil consumption for extraction. It should be remembered that for the production of manganese, ore obtained from already mined rock and stored as waste will be used. The energy requirements per 1 t of pre-processed material will be lower than in the case of manganese extraction from primary sources.

During the process of leaching the concentrate with sulphuric acid, carbonates (carbonates Mn, Fe, Ca, Mg) are decomposed to form CO2. In order to improve the environmental impact of the project, waste CO2 is used for carbonate precipitation instead of ammonium bicarbonate, which leads to an overall reduction in CO2 emissions. The total amount of CO2 emissions produced and released into the atmosphere from the raw material processing process per year is about 59 thousand tonnes. Daily emissions are 177.8 t/day.

Although most of the thermal energy will be taken from the power plant, it will not be possible to use superheated water for some applications and it will therefore be necessary to generate steam by burning natural gas. Emissions from this combustion were estimated at approximately 33 – 52 thousand tonnes per year.

As part of the implementation of the entire project, a relatively large amount of electricity will be consumed, the main point of consumption being the electrolytic excretion of manganese. The total electricity consumption will be 680 GWh/year. In the Czech Republic (according to data from the Ministry of Industry and Trade for 2021), this means the production of 268 thousand tonnes of CO2. However, it should be noted that the notifier intends to purchase only electricity produced from renewable sources. It currently has a contractual relationship with the electricity distributor that covers about 30% of its consumption with CO2-neutral electricity, and other contractual relationships for the supply of emission-free electricity are being prepared. In such a case, the above calculation is purely theoretical and only illustrates the amount of CO2 produced by electricity consumption without this measure and using the current standard mix of electricity in the distribution network.

In the area of the exclusive manganese ore deposit, the vegetation of non-forest trees will be cut down. Similarly, part of the area for the processing plant is covered with mature trees. At the same time, wood plants serve to (at least temporarily) capture CO2 from the atmosphere by storing it in the wood mass. In total, about 79 hectares of trees and shrubs will be gradually cleared as a result of the plan. Most of the trees are younger, with a trunk circumference of less than 80 cm at a height of 1.3 m above the ground (about 99% of trees). These are mainly silver birch and aspen poplar. The number of individuals with a trunk circumference of more than 80 cm above the ground at a height of 1.3 m above the ground is about 1750, mainly Norway maple, Scots pine, silver birch, poplars and oaks. However, this negative impact will be compensated by substitute planted trees within the proposed remediation and reclamation of the DP and outside the DP itself. The draft of the comprehensive plan of remediation and reclamation (Annex No. 8 to the documentation) considers the planting of 265 thousand trees and 66 thousand shrubs, i.e. a total of about 331 thousand pieces of trees. As part of the application for permission to cut down trees, it can be assumed that there will be an obligation to impose additional replacement planting on the territory of the affected municipalities. From this point of view, the plan can be evaluated as neutral in terms of climate protection in the long term.

For the project under consideration, a Life Cycle Assessment Study was prepared. *Life Cycle Assessment (LCA),* conducted by Minviro Ltd. ("Minviro"), a UK-based sustainability and life cycle assessment company, and RCS Global Ltd. ("RCS Global"), a leading global battery supply chain auditor. The aim of the study was to compare the global warming potential ("GWP" or "carbon footprint") of the high-purity manganese products of the project under consideration with those produced by an established industry in China – where 95% of the world's high-purity manganese products are currently produced.

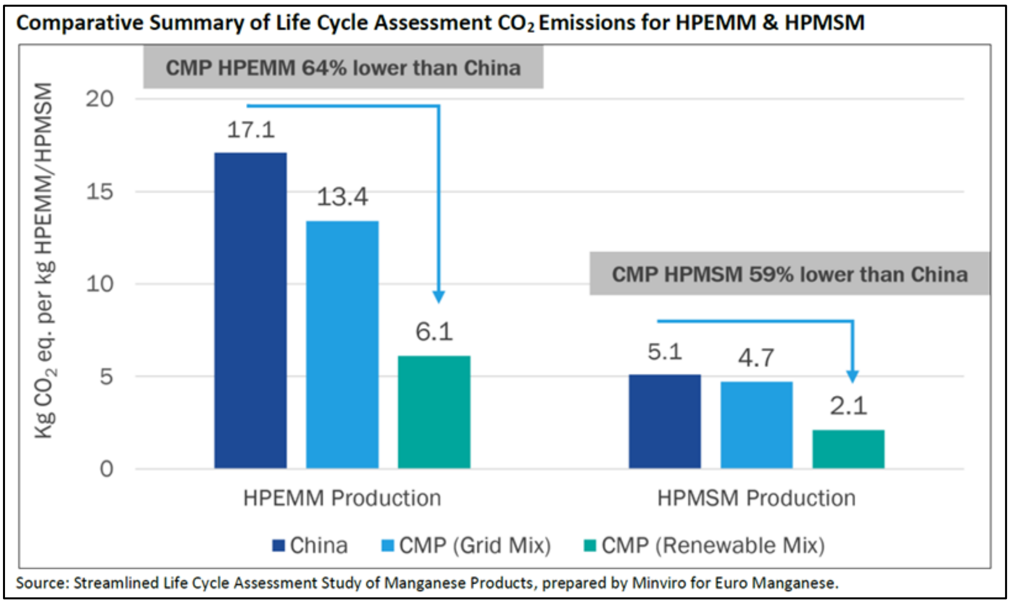
The analysed data were from public sources for various manganese plants. GWP (Global *Warming Potential) processing routes* using both grid electricity and renewable electricity have been evaluated in accordance with LCA best practices and Global Battery Alliance requirements.

Based on the Life Cycle Assessment (Minwiro Ltd., 2021) using 100% renewable electricity, the project's Global Warming Potential (GWP) will be 6.6 kg CO2eq per 1 kg of electrolytic metal produced and 2.3 kg CO2eq per 1 kg of manganese sulphate. The conclusions of this study are presented below in Section D.I.

In summary, the conclusions of the Study can be summarized as follows:

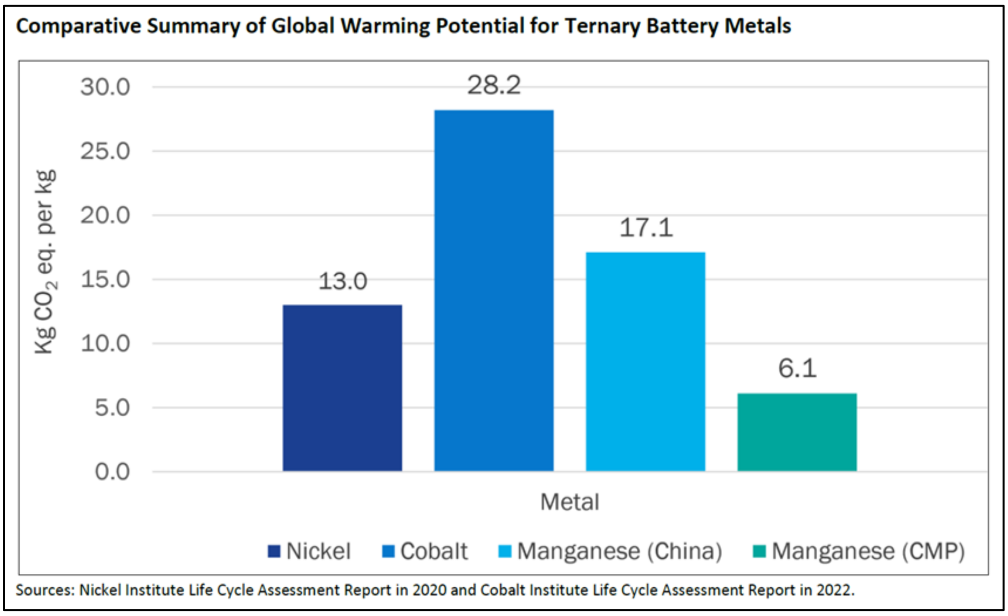
- The global warming potential (GWP) of Chvaletice-based electrolytic manganese metal (HPEMM), using 100 % renewable energy, will be 64 % lower than the estimated GWP of manganese metal produced by existing plants in China (**Chyba! Chybný odkaz na záložku.**).
- Manganese Sulfate (HPMSM) produced by dissolving manganese metal will have a GWP 59% lower compared to Manganese Sulfate produced in China (**Chyba! Chybný odkaz na záložku.**).
- Additional analysis shows that manganese metal will have a significantly lower carbon footprint compared to nickel and cobalt, other battery cathode metals (**Chyba! Nenalezen zdroj odkazů.**).

Picture No. 99 Comparison of Life Cycle Assessments of CO emissions2 for HPEMM and HPMSM



Explanatory notes:
HPEMM – Electrolytic Manganese Metal
HPMSM – Manganese Sulphate
CMP – Manganese project Chvaletice
GWP – Global Warming Potential

Picture No. 100 Comparison of Global Warming Potential for Ternary Battery Metals



Explanatory notes:
HPEMM – Electrolytic Manganese Metal
HPMSM – Manganese Sulphate
CMP – Manganese project Chvaletice
GWP – Global Warming Potential

In general, it can be stated that this is not an activity for its own sake. The need for manganese is determined by the needs of the world economy. Manganese plays a significant role in the storage and supply of electrical energy from batteries, including rechargeable lithium-ion batteries and non-rechargeable alkaline cells. The demand for manganese is growing significantly in the rapidly developing field of rechargeable electric storage tanks, which enable the safe storage of high energy capacities. The demand for high-purity manganese metal and high-purity manganese sulfate is expected to increase significantly in the foreseeable future, mainly due to the expansion of electric vehicle and battery production in Asia, Europe and North America.

According to qualified estimates, the planned capacity of lithium-ion batteries in Europe will increase several times to around 1,400 GWh by 2030, with manganese being used in the production of most of them. High-purity manganese products in the form of manganese sulfate and metallic electrolytic manganese will be supplied by the notifier to manufacturers of electric vehicles, batteries and active cathode materials primarily in Europe. The European market is the fastest growing market for high-purity manganese. This will contribute to Europe's self-sufficiency in raw materials in a key period of structural changes in the European energy sector. The strategic importance of the project is also evidenced by the support from the European Commission and the acquisition of capital investment from the European Bank for Reconstruction and Development (EBRD) to ensure the preparation of the plan.

On the basis of the above considerations, the impact on the climate can be assessed as **insignificant**, even with **favourable aspects**.

Adaptation to climate change

When assessing the adaptation of a given project to climate change, we can draw on the National Action Plan for Adaptation to Climate Change, which is the implementation document of the Strategy for Adaptation to Climate Change in the Conditions of the Czech Republic. The Action Plan is structured according to the manifestations of climate change, due to the significant intersectoral overlaps of individual manifestations of climate change and the need for inter-ministerial cooperation in preventing or addressing its negative impacts: long-term drought, floods and flash floods, rising temperatures, extreme meteorological phenomena (heavy rainfall, extremely high temperatures including heat waves, extreme winds and wildfires). The Strategy for Adaptation to Climate Change in the Czech Republic characterizes the impact of climate change on selected areas of the economy and the environment (sectors).

- *Forestry* – an irrelevant area. The area is not and will not be forested
- *Agriculture* – an irrelevant area. The plan does not address the methods of farming.
- *Water regime in the landscape and water management* – With increasing air temperature, higher evaporation of water from the catchment area is expected, partially compensated by a slight increase in annual precipitation (up to 10% as of the outlook period 2070 – 2099), but rather in winter and in summer a possible decrease in precipitation. In case of water shortage, evapotranspiration is inhibited with a cooling effect, the risk of heat waves, drought and forest fires. Reduction of groundwater recharge and decrease of flows, especially in low-water periods at the transition of summer and autumn, impact on the yield of available water resources, qualitative impact on water at low flows and extreme precipitation, disruption of the function of water management infrastructure and growing requirements for water resources, etc. Extreme precipitation events are directly linked to the processes of soil erosion and the transport of fine sediments, together with fertilizer residues (mainly nitrates) and other adverse substances from flood-affected agricultural activities

(e.g. pesticides), industrial production (toxic metals) and the municipal sphere (microbial pollution).

Adaptation measures of the project: The aim of adaptation measures in water management is to stabilise the water regime in the landscape, to strengthen water resources and to protect them, to use water resources efficiently and to cope with extreme hydrological phenomena – floods and long-lasting droughts. Specifically, the following relevant measures can be mentioned:

3.3.3.2 Rainwater management and water reuse systems - The traditionally implemented rainwater drainage system in the Czech Republic (i.e. rapid drainage of this water through the sewerage system outside the urbanized area) has negative impacts on the local water cycle (flash floods, drop in groundwater levels), the chemical and ecological status of watercourses (especially overflows of rainwater and sewage mixtures from stormwater separators) and the quality of life in urban areas (reduction of air humidity, increase in ambient temperature). Technical measures in the form of retention tanks on the sewer network or behind the storm separator overflow only address the negative impact on the watercourse, not the other impacts mentioned. Rainwater should be understood as a source of water that is managed.

The plan assumes consistent use of rainwater during the implementation and operation of the project. Rainwater will be used for the process of flushing and transport of raw material.

3.3.3.15 Hydric use of mine workings and quarries – Liquidation and reclamation of mine workings and quarries offers opportunities for water retention in the landscape and the creation of water sources for water supply purposes or use in periods of long-term drought. Where the properties of the rock mass allow these areas to be filled with water of the required quality, water sources or natural elements can be created to stabilize the surrounding landscape.

While respecting this measure, a proposal for remediation and reclamation was also carried out. However, the morphology of the terrain and climatic parameters of the area of interest do not allow the formation of large water bodies. However, the terrain after remediation and reclamation is designed with the aim of creating a micro-basin with a central accumulation of rainwater. Precipitation will be drained from the area through the main riverbed forming a valley of the dry polder leading in the south-west direction. Along its route, slight depressions will be deepened with periodic water bodies allowing the development of wetland communities. Rainwater from the outer slopes of the spoil heaps will seep into their surroundings.

- *Urbanized landscape* – an irrelevant area. The area of interest is not and will not be urbanized.
- *Biodiversity and ecosystem services – With an increase in the* average global temperature of more than 2 ºC, an estimated increase in the risk of extinction for approximately 20-30% of plant and animal species, sensitive especially migratory species of organisms, the decline of especially rare species with specific requirements. Shifts in vegetation zones and changes in the quality and distribution of individual habitats will affect the productivity of ecosystems, especially carbon storage ecosystems. Changes in land use can further affect the reflectivity of the Earth's surface and contribute to regional climate change (microclimate). Furthermore, climate change will lead to an increase in the risk of natural disasters such as floods, droughts and biological invasions etc.

Adaptation measures of the project: The plan means the gradual elimination of habitats with low to medium biodiversity. However, the higher biodiversity is largely due to anthropogenics, i.e. the dumping of waste from previous mining activities. After mining, remediation and reclamation of the area will be carried out on secured spoil heaps of waste from manganese ore processing. Biological reclamation will aim at the biological revival of the remediated areas so that they can be handed over for subsequent use. A combination of natural and recreational functions is envisaged, which will be specified in more detail in consultation with local communities. The submitted proposal is consistent with the effort to create a biodiverse area with the potential for the gradual creation of natural habitats with higher biodiversity.

- *Health and hygiene – an* irrelevant area. The risks in this area are seen in the spread of diseases and the risk of injuries caused by extreme weather events.
- *Tourism* – an irrelevant area.
- *Traffic* – due to climate change, more frequent and intense precipitation totals are expected with the result of reduced visibility, or sudden ice and snow totals increasing the number of accidents and non-functionality of the infrastructure, deterioration of passability or impassability to blocking and damage to roads, low water levels endangering water transport. Increased energy consumption during the operation of vehicles, etc.

  Adaptation measures of the project: Special-purpose roads must be maintained by the notifier in a passable condition. The roads will be intended only for the operation of the mining area and the plant.

- *Industry and energy – expected impact of climate change on distribution systems and transmission systems, e.g. increased demand for cooling with the risk of overloading or even disintegration of the grid, outages during extreme events such as storms, floods and temperature extremes, long-term frosts, power line failures and production failures, water shortages reduced production of hydroelectric power plants, etc.*

  Adaptation measures of the project: A possible negative impact may affect the project itself in the sense of the need to interrupt mining due to a power outage or adverse climatic events (storms). Adaptation may consist in a suitable stockpiling of the treated raw material; this possibility is taken into account. A backup power source for the plant is also started.

- *Emergencies and protection of the population and the environment – an assumption of an increase in the frequency and intensity of extreme meteorological events and long-term droughts, large-scale floods, landslides and large-scale forest fires, including threats to the energy system resulting from these phenomena. In order to mitigate or prevent threats to human life, health, the environment and major damage to property.*

  Adaptation measures of the project: The risk of endangering the project by floods cannot be completely marginalized, the project lies on the border of the flood plain. Although the project will not worsen the course of the flood or the consequences of the flood in the area, it could be endangered by flooding, specifically by the ingress of water into the mining area itself (for details, see Chapter D.II). It is necessary to respect this risk and in the next phases of the project design it is necessary to prepare a flood plan that minimizes the consequences of a possible flood. The technical solution could consist mainly in the optimization of mining and remediation procedures so as to avoid leaving a long-term lowered terrain dimension on the edges of the project in contact with the flood plain.

In summary, it can be stated that the project will not cause an increase in the manifestations of climate change in the given area.

3. Impacts on the noise situation and other physical and biological characteristics

The noise associated with mining in the Trnávka DP is evaluated in a noise study together with the operation of the manganese ore processing plant, which is in accordance with legislative requirements.

In order to be able to evaluate the expected contributory noise impacts from the operation of the project in question on the noise burden in the area of interest and in the nearest protected outdoor areas of buildings in the monitored area, the equivalent sound pressure level A was calculated. This calculation was performed for eight consecutive hours during the day (LAeq,8h) and the loudest hour during the night (LAeq,1h) in the protected outdoor areas of the buildings influenced by the project's operations. The results of the noise levels are given as incident sound (evaluated according to the currently valid NV), i.e. it is the noise at the computational point caused by the incident sound field without the considered increase due to reflections from the façade. The calculations are processed in the form of noise maps and are further expressed by specific values of equivalent sound pressure levels in a larger number of calculation points. A list of calculation points is provided in the table below (**Chyba! Nenalezen zdroj odkazů.**). For the sake of clarity, only selected points characterizing the nearest protected outdoor area of buildings in relation to the given source are used for the given noise sources (only the Project's premises, all closed areas, only Cars, only Railways) – see colour differentiation. Some points are used for all sources. The distribution of the points can be seen in the picture (Picture**Chyba! Nenalezen zdroj odkazů.**), for detailed maps, see acoustic study.

Table No. 107: List of Separate Calculation Points in a Noise Study

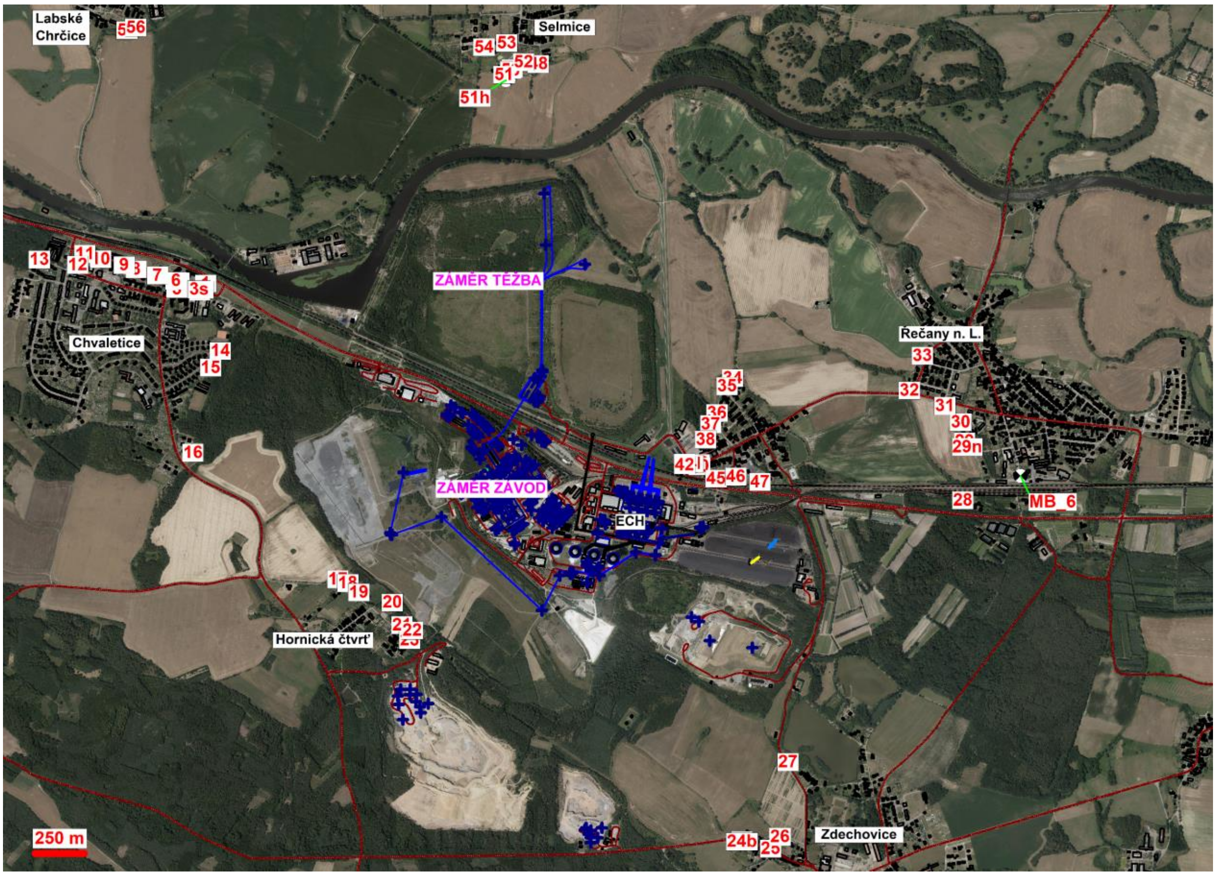
Locality	Watchpoint:	Location (CHVPS):	The project area	All Areas	Automobiles	Railways
Chvaletice	MB_1	2 m in front of the northern façade of the Obránců míru 145 apartment building, a point at the level of the last 4th floor. The point was placed in front of the window of the corridor to the northern façade (it is not a CHVPS). **This is a measuring point according to /12/.**	*	*	*	*
	1	2 m in front of the northern façade of the building (not for housing) with registration number 385, village Chvaletice, point at level 1st floor (not CHVPS).			*	*
	2	2 m in front of the eastern side façade of the family house V Telčice 14, Chvaletice, point at level 1st floor.			*	*
	3	2 m in front of the southern street façade of the family house V Telčice 14, Chvaletice, point at the level of 1st floor.			*	*
	3s	2 m in front of the northern façade of the family house V Telčice 14, Chvaletice, point at level 1st floor.			*	*
	4	2 m in front of the eastern side façade (northern part) of the residential house Obránců míru 147, Chvaletice, point at the level of the 2nd and 4th floor.			*	*

Locality	Watchpoint:	Location (CHVPS):	The project area	All Areas	Automobiles	Railways
	5	2 m in front of the eastern side façade (southern part) of the residential building Obránců míru 147, Chvaletice, point at the level of the 2nd and 4^{th} floor.			*	*
	6	2 m in front of the western side façade (northern part) of the residential house Obránců míru 147, Chvaletice, point at level 2 and 4.NP.			*	*
	7	2 m in front of the eastern side façade (northern part) of the residential house Obránců míru 145, Chvaletice, point at the level of the 2nd and 4^{th} floor.			*	*
	8	2 m in front of the eastern side façade (northern part) of the residential house Obránců míru 143, Chvaletice, point at level 4^{th} floor.			*	*
	9	2 m in front of the northern street façade of the residential building Obránců míru 142, Chvaletice, point at the level of the 3rd and 5^{th} floor.			*	*
	10	2 m in front of the western side façade (northern part) of the residential house Obránců míru 140, Chvaletice, point at level 4^{th} floor.			*	*
	11	2 m in front of the northern street façade of the residential building Kolínská 360, Chvaletice, point at the level of 4^{th} floor.			*	*
	12	2 m in front of the western street façade of the residential building Kolínská 357, Chvaletice, Chvaletice, point at level 4^{th} floor.			*	*
	13	2 m in front of the northern façade of the family house at Kolínská 303, Chvaletice, point at the level of 2^{nd} floor.			*	*
	14	2 m in front of the eastern façade of the family house Palackého 204, Chvaletice, point at the level of 2^{nd} floor.	*			
	15	2 m in front of the eastern façade of the family house Palackého 206, Chvaletice, point at the level of 2^{nd} floor.	*			
	16	2 m in front of the eastern façade of the family house Pod Břízou 455, Chvaletice, point at level 2^{nd} floor.	*			
Hornická Čtvrť	17	2 m in front of the north-east façade of the family house Hornická Čtvrť 128, Chvaletice, point at level 2^{nd} floor.	*			
	18	2 m in front of the eastern façade of the family house Hornická Čtvrť 129, Chvaletice, point at the level of 2^{nd} floor.	*			
	19	2 m in front of the eastern façade of the family house Hornická Čtvrť 142, Chvaletice, point at the level of 2^{nd} floor.	*			
	20	2 m in front of the eastern façade of the family house Hornická Čtvrť 74, Chvaletice, point at level 1^{st} floor.	*			
	21	2 m in front of the north-east façade of the family house Hornická Čtvrť 65, Chvaletice, point at level 2^{nd} floor. **It corresponds to point 2 in the document /23.3/.**	*	*		
	22	2 m in front of the north-east façade of the family house Hornická Čtvrť 75, Chvaletice, point at the level of 2^{nd} floor. **It coincides with point MB_2 in the substrate /12/.**	*	*		
	23	2 m in front of the eastern façade of the family house Hornická Čtvrť 78, Chvaletice, point at the level of 2^{nd} floor. (the point characterizes the CHVPS within the municipality)	*			

Locality	Watchpoint:	Location (CHVPS):	The project area	All Areas	Automobiles	Railways
Zdechovice	MB_3	1.1 m in front of the northern façade of the family house Zdechovice 7, a point at a height of 5 m above the ground (at the level of the 2nd floor of the family house). **This is a measuring point according to /12/.**	*	*	*	
	24	2 m in front of the northern façade of the family house Zdechovice 7, Zdechovice, point at the level of 2nd floor.	*		*	
	24b	2 m in front of the eastern façade of the family house Zdechovice 7, Zdechovice, point at the level of 2nd floor.			*	
	25	2 m in front of the south-west façade of the family house Zdechovice 41, Zdechovice, point at the level of 2nd floor.			*	
	26	2 m in front of the north-east façade of the family house Zdechovice 165, Zdechovice, point at the level of 3rd floor.	*			
	27	2 m in front of the south-west façade of the family house Zdechovice 113, Zdechovice, point at the level of 2nd floor.	*			
	28	2 m in front of the western façade of the family house Stará pila 112, Zdechovice, point at the level of 2nd floor.	*		*	*
Řečany nad Labem	MB_6	2 m in front of the eastern façade of the family house 1.máje 62, point at a height of 2.5 m above the ground (1st floor). **This is a measuring point according to /12/.**	*	*		*
	29	2 m in front of the western façade of the family house at Lesnická 426, Řečany nad Labem, point at the level of 2nd floor.	*			*
	29n	2 m in front of the southern façade of the family house at Lesnická 427, Řečany nad Labem, point at the level of 2nd floor.				*
	30	2 m in front of the western façade of the family house at Lesnická 422, Řečany nad Labem, point at the level of 2nd floor.	*			
	31	2 m in front of the western façade of the family house Obránců míru 369, Řečany nad Labem, point at the level of 2nd floor.	*		*	
	32	2 m in front of the south-west façade of the family house Luční 351, Řečany nad Labem, point at the level of 1st floor. **It coincides with point 3 in the document /23.3/.**	*	*		
	33	2 m in front of the western façade of the family house Luční 366, Řečany nad Labem, point at the level of 2nd floor.	*			
Trnávka	MB_4	2 m in front of the western façade of the family house Obránců míru 90, a point at a height of 4.5 m above the ground (2.NP family house) oriented towards the Chvaletice power plant. **This is a measuring point according to /12/.**	*	*	*	*
	34	2 m in front of the northwest façade of the family house V Ráji 116, Trnávka, point at level 2nd floor.	*			
	35	2 m in front of the south-west façade of the family house V Ráji 111, Trnávka, point at the level of 2nd floor.	*			
	36	2 m in front of the western façade of the family house Dlouhá 49, Trnávka, point at the level of 1st floor.	*			
	37	2 m in front of the western façade of the family house Polní 5, Trnávka, point at the level of 2nd floor.	*			
	38	2 m in front of the north-west façade of the family house Polní 63, Trnávka, point at the level of 2nd floor.	*			

Locality	Watchpoint:	Location (CHVPS):	The project area	All Areas	Automobiles	Railways
	39	2 m in front of the northern façade of the family house Obránců míru 87, Trnávka, point at the level of 2nd floor.	*		*	
	40	2 m in front of the southern façade of the family house Obránců míru 87, Trnávka, point at the level of 2nd floor.	*			*
	41	2 m in front of the northern façade of the family house Obránců míru 89, Trnávka, point at the level of 1st floor.	*		*	
	42	2 m in front of the southern façade of the family house Obránců míru 91, Trnávka, point at the level of 1st floor. **It corresponds to point 1 in the document /23.3/.**	*	*	*	*
	43	2 m in front of the northern façade of the family house Obránců míru 91, Trnávka, point at the level of 1st floor.	*		*	
	44	2 m in front of the eastern façade of the family house Obránců míru 91, Trnávka, point at level 1st floor.	*		*	
	45	2 m in front of the southern façade of the family house Dražní 84, Trnávka, point at the level of 2nd floor.	*		*	*
	46	2 m in front of the southern façade of the family house Dlouhá 99, Trnávka, point at the level of 2nd floor.	*		*	*
	47	2 m in front of the southern façade of the family house Dlouhá 103, Trnávka, point at the level of 2nd floor.	*		*	*
Selmice	MB_5	2 m in front of the southern façade of the family house with the extension of the barn Selmice 25, point at a height of 3 m above the ground (this is not a CHVPS). **This is a measuring point according to /12/.**	*	*		
Selmice	48	2 m in front of the southern façade of the family house Selmice 22, Selmice, point at level 1.NP.	*			
Selmice	49	2 m in front of the northern façade of the family house Selmice 25, Selmice, point at level 2nd floor.	*			
Selmice	50	2 m in front of the western façade of the family house Selmice 25, Selmice, point at level 1st floor.	*			
Selmice	51	2 m in front of the south-eastern façade of the family house Selmice 26, Selmice, point at level 1st floor.	*			
Selmice	51h	On the southern border of the protected outdoor area (built-up area and courtyard) of the family house Selmice 26, a point at the level of 2 m above the ground.	*			
Selmice	52	2 m in front of the south-eastern façade of the family house Selmice 31, Selmice, point at the level of 1st floor.	*			
Selmice	53	2 m in front of the south-eastern façade of the family house Selmice 8, Selmice, point at level 2nd floor.	*			
Selmice	54	2 m in front of the southern façade of the family house Selmice 6, Selmice, point at level 1st floor.	*			
Labské Chrčice	55	2 m in front of the southern façade of the family house Labské Chrčice 6, Labské Chrčice, point at level 2nd floor.	*			
Labské Chrčice	56	2 m in front of the south-eastern façade of the family house Labské Chrčice 8, Labské Chrčice, point at level 2nd floor.	*			

Picture No. 101 Situation of wider relations with calculation points (see acoustic study for detailed maps)



Variants of noise calculation

The noise calculation is made for the following periods:

- Year 2022 (Current state) – variant corresponding to the status at authorized noise measurement, all four ECH units in operation.
- Year 2028_BEZ (Prospective status) – calculation variant for the situation as of 2028 without intent. The ECH area has been modified in the scope of stage 4. However, in order to achieve the highest noise level LAeq,1h = 40 dB for the night in Trnávka (nearest points 42 or MB_4), it is necessary to further reduce the operation of the ECH (and then the KASI), see chapter 8.6.1 in the acoustic study
- Year 2028_SE_ZAM (Prospective state) – calculation variant for the situation as of 2028 with the intention for YEAR 1. The ECH area (and KASI) has undergone modifications to achieve the highest noise level of LAeq,1h = 40 dB for the night in Trnávka.
    - For this state of closed areas, a plan is added in the state for YEAR 3, 6, 12, 18 and 24. In all variants of the calculation, the worst variant of the calculation of noise from mining machines in the area of Mining is considered, i.e. the closest approach of the mechanisms to the residential area.

- Year 2043_BEZ (Outlook status) – calculation variant for noise from road and railway traffic.
- Year 2043_SE_ZAM (Prospective status) – a variant of the calculation for the situation as of 2043 with a plan for noise from automobile and railway traffic.

Noise from the area of the project "Recycling of the Chvaletice – Trnávka tailings"

This is partial noise only from the intention (this includes production activities, operation of HVAC sources, area traffic in a closed area, i.e. where it must pass through a gatehouse or barrier). The calculation is performed for the following variants:

- YEAR 1 = Prospective status with the project in the 1st year of mining (year 2028)
- YEAR 3 = Prospective status with the project in the 3rd year of mining
- YEAR 6 = Prospective status with project in the 6th year of mining
- YEAR 12 = Prospective status with project in the 12th year of mining
- YEAR 18 = Prospective state with project in the 18th year of mining
- YEAR 24 = Prospective status with project in in the 24th year of mining

In all variants of the calculation, the worst variant of the calculation of noise from mining machines in the area of Mining is considered, i.e. the closest approach of the mechanisms to the residential area. The resulting noise values are presented in an acoustic study.

The noise values determined show the following:

- *Chvaletice – points 14-16, MB_1*
  It applies that the partial value of noise only from sources in the area of the project will be at the level of LAeq,8h < 40 dB for the day and L Aeq,1h < 20 dB for the night. The same applies to the other points 1 – 13 (see Table 8-4A).
- *Hornická čtvrť – points 17-23*
  In all points 17-22, the partial value of noise only from sources in the project area will be at the level of LAeq,8h < 40 dB for the day and L Aeq,1h < 25 dB for the night.
- *Zdechovice – points 24-28, MB_3*
  It applies that the partial value of noise only from sources in the project area will be at the level of LAeq,8h < 30 dB for day and L Aeq,1h < 20 dB for night.
- *Řečany nad Labem – points No. 29-33, MB_6*
  It applies that the partial value of noise only from sources in the project area will be at the level of LAeq,8h < 35 dB for day and L Aeq,1h < 20 dB for night.
- *Trnávka – points no.34-47, MB_4*
  It is true that the partial value of noise only from sources in the area of the project will be at the level of LAeq,8h < 40 dB per day, in the case of the last year 24 of the project, when mining will come closest to Trnávka, the value of L Aeq,8h < 48 dB will be 48 dB. At night, the noise value will only be from sources in the area at the level of LAeq,1h ≤ 20 dB.
- *Selmice – points 48-54, MB_5*
  It applies that the partial value of noise only from sources in the project area will be at the level of LAeq,8h < 43 dB for day and L Aeq,1h < 20 dB for night.

- *Labské Chrčice – points no. 55, 56*
  It applies that the partial value of noise only from sources in the area of the project will be at the level of LAeq,8h < 40 dB for the day and L Aeq,1h < 20 dB for the night.

Therefore, it can be stated that the noise in the area from sources in the area of the project will be at a level below the hyg. limits $L_{Aeq,8h}$ = 50 dB for day and LAeq,1h = 40 dB for night, with a margin of 10 dB or more for day and 20 dB for night in most cases. Noise with a tonal component is not expected due to the large number of partial sources that will mask each other (in addition, due to the low noise level from sources in the area of the project, there will be masking with background).

The condition is that the construction of the buildings and acoustic modifications of the sources in the area of the Plant, including the ventilation of the buildings, will be carried out according to Table 5-3-3A and in the background of the quarry according to Table 5-3-2A of the acoustic study (see the documentation Sources of noise from the mining area

Sources of noise in the mining area will be machines and equipment in buildings in the background of the quarry (see **Chyba! Chybný odkaz na záložku.**) as well as mechanization, which will be used in the extraction and handling of raw materials and in remediation and reclamation works. An overview of the individual types of mechanization used in the mining area and the sound power level A (LWA) is given in the following text:

4. *Mechanization for mining operations:*
   2x excavators (CAT374F) – **L_{WA} = 106 dB**
   4x articulated dumper (CAT745) - **L_{WA} = 110 dB**
5. *Mechanization for subsequent remediation works and for the creation of mining waste dumps:*
   2x wheel front loader (CAT972M) - **L_{WA} = 107 dB**
   3x dozer (CATD6N) - **L_{WA} = 107 dB**
   The material will be weighed in by dumpers, which will also take away the excavated material.
6. *Auxiliary mechanization for both processes (mining and remediation):*
   1x grader (CAT160) - **L_{WA} = 106 dB**
   1x vibratory roller (CATCP12) - **L_{WA} = 107 dB**
   Sprinkler truck - **L_{WA} ≤ 105 dB**
   other mechanization (forklift in the workshop, truck, service van, fuel tank) - **L_{WA} ≤ 100 dB**

According to Government Order No. 272/2011 Coll., on protection against the adverse effects of noise and vibrations, the noise level during the daytime is determined for 8 continuous and consecutive noisiest hours (LAeg, 8h). The concurrence of mechanisms in the mining area during continuous operation for the 8 noisiest hours of the day is as follows:

2 x excavator (CAT374FL) - **L_{WA} = 106 dB/excavator**
1x dozer (CATD6N) - **L_{WA} = 107 dB**
100 articulated dumper cycles (CAT745) - **L_{WA} = 110 dB** (100 excavated material runs + 100 remediation runs)
The operating time of the mechanisms is 7 hours for an eight-hour work Shift.

and Table No. 58) that condition was incorporated in Chapter D.IV of the dossier.

In the case of the municipality of Trnávka, the reserve will be at least 2 dB or more during the day for the last year of the project, i.e. year 24, when mining will be closest to Trnávka.

Noise from closed industrial areas in the area, including the assessed project

This is partial noise from INDUSTRIAL AREAS in the area (this includes production activities, operation of HVAC sources, area traffic in closed areas, i.e. where it is necessary to pass through the gatehouse or barrier). The calculation is performed for the following variants:

- Year 2022 (Status quo).
- Year 2028_BEZ (Prospective status)
- Year 2028_SE_ZAM (Prospective Status)
  - For this state of closed areas, a plan is added in the state for YEAR 3, 6, 12, 18 and 24. In all variants of the calculation, the worst variant of the calculation of noise from mining machines in the area of Mining is considered, i.e. the closest approach of the mechanisms to the residential area

The noise values determined show the following:

- *Chvaletice (MB_1), Hornická Čtvrť (22=MB_2, 21), Zdechovice (MB_3), Selmice (MB_5), Řečany nad Labem (MB_6, 32)*

It applies that the partial value of noise only from sources in closed areas in the area with the inclusion of sources in the area of the project will be at a level below the hyg. limit $L_{Aeq,8h}$ = 50 dB for day and LAeq,1h = 40 dB for night.

- *Trnávka (MB_2, 42)*

It applies that the partial value of noise only from sources in closed areas in the area with the inclusion of sources in the area of the project will be at the level below the hyg. limit $L_{Aeq,8h}$ = 50 dB per day. This also applies to the last year of mining YEAR 24 of the plan, when mining will come closest to Trnávka.

In the case of night time, the noise value is only from sources in closed areas in the area with the inclusion of sources in the project area at the level of LAeq,1h ≤ 40 dB for the night. However, this is provided that the noise from the ECH premises reaches the target limit of LAeq,1h = 40 dB.

The reason is that the partial value of noise at night only from the project site will be in the municipality of Trnávka at a level well below LAeq,1h ≤ 25 dB (see Table 8.6.3-1 and 2 in the acoustic study).

From Table No. 8.6.4.1 in the acoustic study, it is clear that if the hyg. noise limit $L_{Aeq,1h}$ = 40 dB for the noisiest 1 hour at night in the municipality of Trnávka only from sources in closed areas in the area, the contribution of the area of the project will be 0.0 dB (see the columns in the table "Difference WITH INTENTION minus NONE").

Therefore, it can be stated that partial noise from sources in enclosed areas with the inclusion of the project area will be in the area at the level to hygs. noise limit of 50 dB for day and 40 dB for night. However, this will only happen when the ECH meets the target limit of 40 dB for the night. However, it is essential that even with a higher value of noise pollution due to existing sources, the assessed project will not worsen the acoustic situation in Trnávka by even 0.1 dB.

Noise from car traffic on public roads

This is partial noise only from car traffic on public roads (this does not include traffic in closed areas, i.e. where it must pass through a gatehouse or barrier).

The calculation is performed for the following variants:

- Year 2022 (Status quo).
- Year 2025 WITHOUT (Prospective state WITHOUT PROJECT).
- Year 2028 WITHOUT (Prospective state WITHOUT PROJECT).
- Year 2028 SE ZAM (Prospective state WITH PROJECT in the 1st year of mining).
- Year 2028 with ZAM SCREEN (Prospective state WITH INTENTION in the 1st year of mining, with an acoustic screen in Chvaletice along road 322, according to chapter 8.6.1).
- Year 2043 WITHOUT (Prospective state WITHOUT PROJECT).
- The year 2043 SE ZAM (Prospective state WITH PROJECT).
- Year 2043 WITH ZAM SCREEN (Prospective state WITH PROJECT, with an acoustic screen in Chvaletice along road 322, according to chapter 8.6.1).

The noise values determined show the following:

- *Chvaletice – points MB_1, 1-12, 3s*

The dominant source of noise in points 7 - 12 is the northern bypass road (II/322, new road after 2001), so noise is evaluated by limits 60/50 (day/night). The noise limit for the night of 50 dB is exceeded in points, and in addition, there is an increase in noise after the project is put into operation, as a result of the induced traffic of the project. For this reason, an acoustic screen was designed along the II/322 road, which will be connected to the existing wall. The acoustic screen will run along the southern edge of the II/322 road, connects to the existing screen by the road and continues westwards to the intersection with V Telčice Street. The screen has a total length of 476 m, a height of 3 m above the surface of road No. 322. The screen must be installed along the roadside at a distance of up to 1 m. The structure of the screen must have sound insulation at the level of at least R_w = 25 dB, the surface of the acoustic screen may be reflective (i.e. e.g. glass). The location of the acoustic screen is shown in Picture 8.6-1.A in Section 8.6.1 and also in Picture 8-6-5A in the acoustic study. By calculation, the detected noise values with the Acoustic Screen are already at points below or at the level of the limit of 50 dB for the night, but most importantly, the intention does not increase the noise compared to the state without the Acoustic Screen.
In other points MB_1, 1-6, the noise is evaluated by the limits of 68/58 dB day/night and these will be observed even after the implementation of the plan.
It is therefore true that the project will be satisfactory in terms of noise from car traffic on the public road network to the above-mentioned construction of a noise barrier.

- *Zdechovice – points No. 24, 24b, 25*

In the case of point 24 (CHVPS oriented directly to the I/2 road, moreover on the outskirts of the village, where cars have an even higher speed), it exceeds the noise limits of 68/58 dB (day/night) and the intention increases the noise by 0.1 dB during the day (at night the increase is 0.0 dB). However, in the side façade, perpendicular to I/2 (point 24_b), the noise is already below the limits of 68/58 dB even after the implementation of the plan. Therefore, it can be stated that although the northern façade of the family house facing I/2 is unsatisfactory in terms of noise, the side facades of the family house, which can be used to ventilate the protected interior space of the buildings, are suitable. However, it is necessary to ensure that the living room with windows facing the I/2 road (point 24) also has a window to the side façade (point 24b). Alternatively, it is necessary to ventilate the protected interior space of buildings with windows only to the northern façade to the I/2 road using a system independent of the opening of the windows.

At the next point 25 (the CHVPS is also facing the I/2 road, but the point is at a greater distance from the sign indicating the village and cars already have a properly reduced speed), the noise level is below 68 dB during the day even after the project has been put into operation. At night, the noise exceeds the limit of 58 dB, but the intent charge is 0.0 dB.
The project is satisfactory in terms of noise from car traffic. In the only case of the building Zdechovice 7, municipality of Zdechovice, it is necessary to ensure that the protected interior spaces of buildings with windows only to the northern façade to the I/2 road also have windows to the side eastern façade, alternatively it is necessary to ventilate such spaces with a system independent of the opening of the windows.

- *Trnávka – (points č. MP_4, 39, 41, 42, 44), Řečany nad Labem (points 31, 32)*

The limits of 68/58 dB apply, which will be met even after the implementation of the plan. The project is satisfactory in terms of noise from car traffic.

Rail traffic noise on public roads

This is partial noise from railway transport on public roads (this does not include sidings in closed areas, see the area of the Chvaletice Power Plant, or the project).

The calculation is performed for the following variants:

- Year 2022 (Status quo).
- Year 2025 WITHOUT (Prospective state WITHOUT PROJECT).
- Year 2028 WITHOUT (Prospective state WITHOUT PROJECT).
- Year 2028 SE ZAM (Prospective state WITH PROJECT in the 1st year of mining).
- Year 2043 WITHOUT (Prospective state WITHOUT PROJECT).
- The year 2043 SE ZAM (Prospective state WITH PROJECT).

The noise values determined show the following:

- *Chvaletice (point MB_1, .1-12, 3s), Zdechovice (point 28), Řečany nad Labem (points 29, 29n, MB_6), Trnávka (points MB_4, 40, 42, 44-47)*

Hyg applies. 68/63 dB noise limits from operation on a public railway line and limits. These limits will be complied with after the implementation of the project. The intention is satisfactory from the point of view of noise from train transport.

Construction noise

Based on the results of the acoustic study, it can be stated that the noise in the protected outdoor area of the surrounding residential buildings in the area of the construction site of the planned project will be expressed for the mentioned most noise-exposed technological stages of the construction by the value of LAeq,14 hours below the hygienic noise limit of 65 dB for the daytime in the time period of the construction duration of 7 – 21 hours. In the case of operation of sludge pumps (can be operated 24 hours a day, up to 12 pieces in total) the noise will be at a level below the hygienic noise limit LAeq,8h = 45 dB for the nighttime. (results are at LAeq,8h < 35dB level).

At distant calculation points, especially in Zdechovice, the noise is stabilized for all stages of construction, as there is significant noise only from construction site traffic on road No. 2. The noise in Zdechovice in the vicinity of I/2 from the construction site traffic is at the level of $LAeq_{,\ 14h}$ = 58 - 59 dB, the maximum traffic in this section was considered to be 50% of TN, i.e. a total of 80 TN trips. If the traffic from the construction site was led at 100% TN in the direction of road I/2, the noise level would be about 3 dB higher, i.e. still with a reserve below the hyg. limit $L_{Aeq,14h}$ = 65 dB.

In the next phases of the construction of the project, it can be assumed that the values of LAeq,14h in the monitored points No. 1 – 56 will be lower, or at the same level compared to the values in Table No. 9D (the noisiest stages of the construction and for maximum construction site traffic are evaluated).

The graphic appendices to this AS contain the calculation situations for the above-mentioned stages of construction within the construction of the project with the display of noise zones at a height of 5 m above the terrain (2nd floor).

Overall assessment of the impact of noise

The project is located in an acoustically problematic area with the occurrence of many plants that form stationary noise sources and also with linear noise sources, i.e. railways and roads. For this reason, the assessment was conceived comprehensively, and all existing relevant sources of noise were considered and mapped in great detail. Details, including noise measurement protocols, are in the acoustic study.

After the revision of the acoustic study and the tightening of the requirements for acoustic protection, it can be stated that the impact of noise from the operation of the project, from railway and road transport, as well as the impact of noise from construction can be evaluated as **insignificant**.

The evaluation of the impact of noise as insignificant is carried out on the basis of the following assumptions, given in Chapter 10.2 of the acoustic study:

1. ACOUSTIC SCREEN ALONG ROAD II/322 IN CHVALETICE

The acoustic screen runs along the southern edge of road No. 322, connects to the existing screen by the road and continues westwards to the intersection with V Telčice Street. The screen has a total length of 476 m, a height of 3 m above the surface of road No. 322. The screen must be installed along the roadside at a distance of up to 1 m. The structure of the screen must have sound insulation at the level of at least R_w = 25 dB, the surface of the acoustic screen may be reflective (i.e. e.g. glass). The location of the screen is shown in Picture 8.6-1.A in Section 8.6.1 and also in Picture 8-6-5A in Section 8.6.5 in the acoustic study.

The reason for the construction of the acoustic screen in this section of road No. 322 is the fact that the hyg limit $L_{Aeq,}$8h = 50 dB for the night (the road section was put into operation after 2000) and in some places also LAeq,16h = 60 dB for the day, and after the commissioning of the project, the noise deteriorates at these points. The noise barrier will ensure that the noise level below the above-mentioned hygs will be at points even after the project has been put into operation. noise limits, i.e. the intention will not worsen unsatisfactory noise conditions.

2. RESTRICTION OF OPERATION OF THE SIDING TO THE PROJECT AREA AT NIGHT

It is a freight train up to 370 m long (15 wagons) and weighing up to 2000 t. The prerequisite is to divide the intensity into 1x arrival of the train to the premises (via the gate under the bridge of road no. 322) for the morning shift after 6:00 (unloading of the train as part of the morning shift) and 1x departure of the train from the area of the project before 22:00 (after loading within the afternoon shift). The train will move in the area of the project and in the area of the Chvaletice Power Plant (detour siding) only during the day.

3. RESTRICTION OF THE OPERATION OF AREA TRANSPORT INSIDE THE PROJECT PREMISES AT NIGHT

All traffic on the area roads in the closed area of the project will be out of operation at night. Employees of the plant and mining will use publicly accessible car parks to arrive on shifts.

4. CONDITIONS FOR THE OPERATION OF EXISTING NOISE SOURCES IN THE AREA

Based on the approval of the KHS of the Pardubice Region dated 25.11.2022, Ref. No. KHSPA 21898/2022/HOK-Pce, the implementation of noise control measures in the ECH area is considered to be implemented in the scope of stage No. 4 – implementation by 31.12.2023, optimization of measures by 30.6.2025. However, according to the basis of the result of the preliminary discussion with the KHS, it is necessary to set up the computational model of noise from sources in the ECH area so that the noise from closed areas fills the hyg. limit $L_{Aeq,1h} = 40$ dB for the night in Trnávka (CHVPS 42 and MB 4) and to prove that after taking into account the noise sources in the area of the project, the value of 40 dB will not increase by 0.1 dB for the entire duration of the project, i.e. YEAR 1 – YEAR 25.

In the overall computational model, the main sources of ECH noise (turbine hall, transformers in the 400 kV substation, transformers in the 110 kV substation, coal handling, coaling bridges and towers, cooling, flue gas fans, ...), as well as noisy diffusers in the KASI area, are set in such a way that the contribution of the ECH with existing other areas in the area is at points 42 and MB 4 in Trnávka at the level up to $L_{Aeq, 1h} = 40$ dB per night.

With regard to point 4, it should be noted that this is a boundary condition of the calculation in the noise study. However, this is not a condition for the implementation of the plan! Acoustic modifications of the project (see the following point 5) were carried out in such a way that the project would not increase the noise in the area even if the noise from other sources was reduced to the level of the hygienic limit. However, it also means that the intention will not increase the noise, not even with the above-limit noise pollution, which is currently in Trnávka at night and will certainly be for some time. The noise impact is assessed as not significant, regardless of the noise levels generated by other sources in the vicinity. This should be considered as the fundamental advantages of acoustic treatments. The evaluation of traffic noise is conducted with a substantial safety margin, emphasizing a cautious approach in the assessment.

5. CONDITIONS FOR THE OPERATION OF THE NOISE SOURCES OF THE PROJECT

It is necessary to comply with the noise parameters of the HVAC sources in the MINING area, including the soundproofing parameters of the external cladding of the buildings according to Table 5.3.2A in the acoustic study, including forced ventilation (see Table No. 71 in this documentation).

It is necessary to comply with the noise parameters of the HVAC sources in the PLANT area, including the soundproofing parameters of the external cladding of the buildings according to Table 5.3.3A in the acoustic study, including forced ventilation (see Table No. 72 in this documentation).

Operation in the mining area, i.e. the actual mining represented by the operation of mining mechanisms, NA and auxiliary mechanisms in the mining area, is possible only in the day.

6. CONDITIONS OF OPERATION OF INDUCED TRANSPORT

It is necessary to observe the traffic intensity of the project according to Table 5.3-1A in the acoustic study.

It is necessary to comply with the intensity of induced railway traffic of the project and the size of trains according to section 5.3.3 in the acoustic study.

7. CONDITIONS OF OPERATION OF INDUCED TRANSPORT

In the case of the building Zdechovice 7, municipality of Zdechovice, it is necessary to ensure that the protected interior spaces of buildings with windows only to the northern façade to the I/2 road also have windows to the side eastern façade, alternatively it is necessary to ventilate such areas with a system independent of the opening of the windows.

With regard to point No. 7, it should be stated that its fulfillment does not depend entirely on the possibilities of the notifier, but also depends on the willingness of the owner of the building in question. In the event that the owner is not interested in the proposed modification of the property despite the notifier's offer, the processor of the documentation evaluates the acoustic impact in the context of the entire project as insignificant. This assessment is also based on the fact that the operator of the noise source in the case of a class I road is not the notifier, but the owner of the road, and it is the only object problematic from the point of view of noise.

Vibration effects

Vibration from operation

The operation of the quarry will not generate any vibrations that would propagate to the surroundings. Blasting will not be used. Vibrations will only affect the operator of working machines, but it is assumed that modern mechanization with high comfort and low negative effects on the operator will be used.

There will be no significant sources of vibration in the processing plant.

Vibrations from traffic

Heavy goods vehicles that will serve the project (but only partially, most of the bulky transport will be carried out by rail) can theoretically be a source of vibrations that spread from the road to the surroundings and can also manifest themselves in buildings adjacent to roads. The assessed project is expected to have a daily freight transport intensity of up to 42 trucks.

The processor of the documentation has at its disposal archival data from the measurement of the effects of vibrations from traffic at other locations. On the basis of measurements carried out in the past on class III roads with the location of buildings in close proximity to roads, it can be stated that the hygienic limits for vibrations according to Government Regulation No. 272/2011 Coll. are routinely met in the protected interior spaces of buildings along the roads used. The limit value in protected interior spaces of buildings given by the vibration acceleration level $L_{aw,T}$ = 75 dB (or the vibration acceleration value andew,T = 0,0056 m/s2) is complied with. Therefore, the limit values are usually met without the use of correction according to Annex No. 5 to Government Order No. 272/2011 Coll. (i.e. permitted corrections for living rooms during daytime + 6 dB).

Archival data from measurements at a similar location also show that during measurements carried out at a family house at a distance of 2 m from the road travelled by freight transport from the quarry, it was found that the measured intensity of vibrations caused by traffic with a large margin did not exceed the permissible limit of the effective vibration speed of 1 mm/s for repeated shocks of the character of a long-lasting shock load according to ČSN 730040 for the reference site and the degree of failure "0". With the measured intensity of the shocks, any new damage to the paint or plaster can be ruled out.

In terms of vibrations, relatively heavy vehicles with only two axles, typically buses, show the highest effect. The project will be operated by modern tractor-trailer combinations, or trucks with trailers, where the weight of the vehicle is evenly distributed on 5 axles. The effects of vibration are lower in this case. Of course, it depends on many circumstances, where a more significant negative impact of vibrations and shocks can be in the case of a road in poor technical condition (breakdowns, potholes), poorly designed or implemented road construction, unsuitable subsoil of the road construction layers or their interconnection with the foundations of buildings.

It can be stated that the II/322 road in the vicinity of the project runs outside the urban area and its technical condition is good. The increase in the intensity of freight transport will not be significant and traffic will continue to be directed to the superior transport network (category I roads, motorways). Therefore, it can be stated that the intention will not worsen the current effects of vibrations from traffic. It can be stated that the vibration limit values according to ČSN 730040 and Government Order No. 272/2011 Coll. will not be exceeded in the buildings in the surrounding municipalities.

Vibration during the construction period

Construction machinery is often a source of vibrations. Due to the distance of residential houses, the influence of vibrations does not apply in the residential development of municipalities. The issue of vibration is thus reduced to the standard protection of workers during construction.

On the basis of the above, the influence of vibrations is collectively evaluated as **insignificant** in all phases of the project.

Light pollution

The project will be adequately illuminated during the operation period so that all processes operating in reduced visibility can be operated safely and reliably. Extraction of the raw material and reclamation work will take place from 6 a.m. to 10 p.m., i.e. even in low visibility. The operation of the plant (including the leaching station in DP) will be three-shift, i.e. also at night. At night, however, the processing processes will take place almost exclusively indoors.

In February 2023, the technical standard ČSN 36 0459 – Reduction of adverse effects of outdoor lighting (effective March 2023) was issued, the binding nature of which is being prepared as part of the implementing regulations to the Building Act. The parameters of the standard apply to five application areas: road lighting (roads, parking lots, pavements, bicycle paths), outdoor workplace lighting (warehouses, halls, airports), outdoor sports ground lighting (stadiums, ski slopes), architectural lighting (monuments, works of art) and advertising lighting (billboards, LED panels). Thus, they also apply to permanent outdoor electric lighting, but on the other hand, they do not apply to temporary outdoor lighting such as Christmas lights or cultural events. Likewise, the standard does not regulate indoor lighting, even if it penetrates into the outdoor space.

According to Table 3 of the cited standard, the area of the processing plant is located in zone Z2 (Built-up areas and buildable areas in municipalities O1 (municipalities without status) and in peripheral and detached parts in municipalities O2 and O3 (city and township), i.e. the environment is not very bright. However, the existence of the Chvaletice Power Plant with significant night lighting does not seem to correspond to this area.

On 30 June 2020, the Ministry of the Environment, Department of Environmental Impact Assessment and Integrated Prevention issued a methodological guideline on the prevention and reduction of light pollution in relation to procedures under Act No. 100/2001 Coll. have been submitted taking into account the following general measures to prevent the occurrence of light pollution:

- design lighting that is friendly to the night environment, that uses modern knowledge and technology, is purposeful and does not bother its surroundings;
- design lighting systems in such a way that light escapes as little as possible into an area that is not intended for illumination;
- unless there are serious operational or safety reasons preventing it, direct the luminous flux only to the lower half-space;
- when designing the illumination of outdoor areas or transport structures, do not aimlessly oversize the illumination;
- if operational or safety circumstances do not require it, avoid light sources with a high proportion of short wavelengths < 500 nm, or light sources with a higher proportion of the blue spectral component - so-called cool white light (with a high value of the substitute colour temperature "CCT"), it is recommended to be lower than or equal to 2 700 K during night-time rest;
- avoid devices with the emission of stroboscopic and laser light effects into the external environment;
- adapt the intensity of advertising lighting and lighting of industrial and commercial centres to the surrounding environment; in the case of inscriptions and advertising signs, to prefer to emphasize the contours rather than all-over lighting;
- switch off lamps and advertising lighting when they are not needed (during quiet hours, after the closure of businesses, etc.);
- design lighting that respects the privacy and health of residents (prevent outdoor lighting from shining into the windows of residential buildings);
- By appropriate technical or other measures, ensure that as little light as possible escapes outside the illuminated objects.

The following criteria are used to reduce the adverse effects of outdoor lighting:

- lighting design tolerances;
- brightness of the façade of the building;
- the brightness of the characters;
- vertical illumination on objects;
- operating luminosity class;
- the proportion of upper light;
- threshold increment;
- spectral properties;
- Controllability of the lighting system.

Parameters for limiting the adverse effects of outdoor lighting and their limit values are given in Table 4 and Table 5 of the cited standard.

From the above, it is clear that the requirements of ČSN 36 0459 do not apply to mining activities in the mining area. Only to a reasonable extent can the above-mentioned requirements of the methodological instruction of the Ministry of the Environment be applied.

Mining (as well as remediation and reclamation work) will not take place at night. Lighting of mining sites will therefore be only during the daytime (6:00 - 22:00) and in reduced visibility. In reality, the time interval will be even shorter, because employees come to work at 6 a.m. and leave the campus at 10 p.m. Mining and transport equipment is equipped with its own headlights for work in the dark or in low visibility. This lighting is sufficient for the work, so no external lighting (on poles, etc.) will be built. Mechanization illuminates the space at its own workplace and the internal road. The aim of this lighting is to ensure efficient and safe performance of one's own work activities. High beams will not be used on trucks. In addition, the main quarry road runs on a lowered terrain between tailings (existing and newly built spoil heaps), so the light from trucks to it will not spread outside the mining area. During the entire course of mining, there will always be only 2 workplaces in the area (one excavator on each and trucks gradually arriving to it). These 2 workplaces (in one mining section, i.e. relatively close to each other) will gradually move over the entire DP area over the course of 25 years. It is therefore obvious that the entire area of the tailings will never be illuminated and for the entire duration of the project there will be unlit areas on an untouched and already reclaimed area, which can also be evaluated positively in terms of the impact on biota.

The entire area of the processing plant will be illuminated by outdoor lighting of the internal roads and handling areas. Modern outdoor lighting will be used respecting the requirements of the new standard ČSN 36 0459 – Reduction of undesirable effects of outdoor lighting (effective March 2023). The requirements of this standard will be taken into account and will be specified in further design work for the follow-up procedure. The requirements for zone Z2 should be observed.

When assessing the impact, it is necessary to consider the actual location of the processing plant with night operation in relation to the surrounding villages. The plant will be located directly in the western vicinity of the Chvaletice Power Plant, which is the dominant source of night lighting in the area. The power plant will thus significantly mask the light from the plant, especially for the municipalities of Trnávka, Řečany nad Labem, Zdechovice and partially for other municipalities. The villages of Selmice and Labské Chrčice are already very far from the plant and especially at Selmice, visibility will be significantly shaded by the existence of its own tailings. The town of Chvaletice will also be shaded by the wooded Kýpa hill, which lies east of the town. That leaves only the Hornická čtvrť, more than 500 m from the plant to the southeast. Especially with regard to this development, the lighting of the plant should be designed.

It is also necessary to consider the fact that lighting existed in the area of the proposed processing plant in the past, it is mostly a brownfield area. This lighting will be replaced by new energy-saving and efficient lighting in accordance with the cited standard.

The above assessment for residential areas can also be applied to specially protected areas according to Act No. 114/1992 Coll. Nature Reserve Týnecké modřiny (3 km from the plant), Nature Reserve Labské rameno (5 km), Nature Reserve Na Hornické (7 km), Protected Landscape Area Železné hory (13 km) will be out of the influence of light pollution.

Requirements for minimizing light pollution are part of the draft measures in Chapter D.IV. If these measures are observed on the basis of the facts mentioned above, the impact is evaluated as **insignificant.**

Influences on other physical characteristics

No form of harmful radiation will be produced by the implementation of the project. This effect is evaluated as insignificant in terms of size and significance.

Electromagnetic separation is a common procedure in the treatment and refining of minerals. It is also used, for example, in the removal of undesirable impurities in the treatment of glass sands or kaolin. The effects of the magnetic field used in electromagnetic separation are concentrated only in the immediate vicinity of the facility itself, not outside the buildings.

Biological influences

On any overburden and clearance depots, there is generally a presumption of the spread of common ruderal and weed species. Other areas with an increased risk of the spread of synanthropic and ruderal species are handling areas with an unpaved surface, road edges etc.

The plan assumes gradual excavation of the sludge pond area and continuous remediation and reclamation. The area needed for mining in the current year will always be hidden. Reclamation (insulation layer, soil, greening) will take place immediately after mining. There will be no large temporary deposits of any material.

The hidden area for mining will be driven and continuously excavated, and within one year the successional processes will not be able to develop much. The soil from the overburden will be transported to the site of remediation and reclamation.

To the west of DP, there will be a temporary dumping facility for materials obtained during demolitions and, in particular, earthworks in the area of the plant. These materials will be used for the remediation of tailings and will replace the originally considered import of soil from other locations. This reduces the risk of introducing undesirable species. However, even this depot will need to be maintained (grass seeding, mowing) to prevent the spread of invasive and non-native species.

Remediation and reclamation require targeted sowing of herbs and tree plantings. However, smaller areas of controlled succession are also planned. The remediation and reclamation in all reclaimed areas will also include subsequent monitoring and continuous liquidation of self-seeding of unsuitable trees and unsuitable species of herbs and grasses. All these measures will be proposed in the Biological Monitoring Plan, which will be discussed with the relevant nature authorities and affected municipalities as part of the permit procedures.

In the case of compliance with the above-mentioned measures, which are part of the plan, this biological impact can be assessed as **insignificant.**

4. Effects on surface water and groundwater

The impact on groundwater and surface water is summarized in a separate assessment, which forms Annex 4 to this documentation. The evaluation is based on other expert studies based on drilling work, hydrogeological monitoring, determination of groundwater and surface water quality and groundwater flow modelling from 2015 – 2022 (e.g. Francírek, 2019; Kuchovský, Říčka, 2019; Lisovoi, 2021; Lisovoi, 2022).(Frydrych, 2022)

Change in groundwater and surface water quality

With regard to the identified contamination of groundwater and surface water in the tailings and its vicinity, where the source of the pollution is demonstrably deposited material, the excavation of the tailings can be considered a positive intervention. As mining progresses, the surface of the tailings will be drained, and rainwater captured on the surface of the bodies will be drained away from the mined area. This procedure will significantly reduce the total volume of surface water infiltrated into the stored material and thus reduce the leaching of pollutants from the tailings into the groundwater of the collector of the Quaternary Elbe terraces and subsequently into surface water.

The extracted raw material will first be repulped before processing, the slurry will be subjected to magnetic separation and the magnetic separation will then be acid leaching. After treatment and recovery of the useful component (manganese) from the processed material, the unusable part (mining waste) will be deposited back into the excavated area on the hoppers.

The material to be deposited will consist of two components. Approximately half of the material will be separated after magnetic separation. No chemical substances will be used during the magnetic separation, the processing will be based on the physical principle, where the component of interest containing manganese, as well as other magnetic substances such as iron, will be separated in a strong magnetic field. These are the components that currently form the main pollutants at the siteThe other half of the deposited material will consist of the material left over after the processing of the magnetic separate. The magnetic separation will be processed chemically, by leaching in sulphuric acid. An unusable ingredient will be subjected to multiple washing processes for neutralization before being stored. This part will also be free of manganese, iron, as well as other undesirable metals such as zinc, copper, cobalt, nickel or lead, which are contained in trace amounts in the tailings source material. Compared to the original material of the tailings, the deposited material should contain a negligible proportion of today's main pollutants – manganese and iron.

Spoil heaps will be formed on pre-prepared base areas, which will be reinforced, insulated and drained. The surface of the spoil heaps will be closed with another insulating layer and recultivated with a fertilable layer. The entire body of the dump will thus be completely isolated, there will be no interaction with rainwater or groundwater. If the deposited material contains a small number of pollutants even after processing, the insulation of the hopper will prevent the washing of residual pollution into groundwater. The functionality of the insulation and, if necessary, the degree of washing out of residual contamination can be monitored by means of water flowing from the drainage system. However, after the completion of the remediation and reclamation of the area, no water should drain from the drainage system.

The chemical status of the groundwater body in question (11400 - Quaternary of the Elbe to Týnec) is evaluated as unsatisfactory due to unsatisfactory concentrations of pesticides, NO3, Cl, SO4, PO4, metals, PAHs and benzene. In the area of interest, the tailings also contribute to the groundwater pollution by some of the above-mentioned indicators, but it is not the only source of pollutants in the area of interest**.** The implementation of the project will thus have **a positive impact** on the qualitative characteristics of groundwater in the area of interest, as one of the sources of groundwater pollution at the site will be eliminated. From the point of view of water planning (Act No. 254/2001 Coll., Directive No. 2000/60/EC), a partial improvement of the chemical status of the groundwater body in question can be expected in the event of the implementation of the project (11400 - Quaternary of the Elbe to Týnec). The implementation of the project will in no way **result in a negative change in the** quality status of the groundwater body concerned, nor will it be an obstacle to the achievement of the objectives arising from the Water Framework Directive.

The quality of surface water will be indirectly affected by the remediation of the tailings. This is currently a source of groundwater pollution, which is then drained into the Elbe and contributes to an increase in the concentration of some indicators in the Elbe. As part of the remediation and reclamation of the deposit, the entire body of the hopper will be completely isolated. Compared to the current state, this will prevent the formation of leachates, which negatively affect the quality of groundwater and surface water.

In relation to the quality of surface water in the Elbe, the implementation of the project in the part of mining, remediation and reclamation of the tailings clearly represents **a positive impact.**

During the operation of the project, 126 m3/day (1.5 l/s) of wastewater (84 m3/day of industrial and 42 m3/day of sewage) will be generated. All wastewaters will be treated in such a way that the output parameters meet the emission limits for the parameters that are regulated in the decisions on the best available techniques conclusions up to the maximum values set out in these decisions, and for the other parameters the legislative limits for the discharge of wastewater into watercourses according to Government Order 401/2015 Coll. for wastewater discharged into watercourses.

The discharged wastewater represents another mass contribution of the above indicators to the current chemical status (pollution) of the surface waters of the Elbe. The discharged wastewater will be gradually diluted, the degree of influencing the qualitative status of the surface water of the Elbe will depend on the mass flow of the emitted indicator in wastewater, the current concentration of the parameter in surface water and the discharge. Due to the total flow of the Elbe (Qa = 59.7 m3/s) and the amount of wastewater discharged (1.5 l/s), there will be a significant dilution of the discharged wastewater and thus a further reduction in the concentration of emitted substances in the flow profile of the Elbe.

The evaluation shows that even at the least favourable level (the emitted indicators reach maximum concentrations and the flow rate in the Elbe reaches minimum values of Q355 = 17.1 m3/s), the discharge of wastewater by the project will have a negligible impact on the overall status of indicators in the Elbe. Due to the significant dilution of wastewater in surface water, the concentrations of individual parameters will remain practically at the same values, the change (increase) of the concentration is at the level of max. 0.0X % of the value of the current concentration. Even with the contribution of discharged wastewater, the concentrations of individual indicators in the Elbe will continue to meet the criteria of permissible surface water pollution according to Annex No. 3 to Government Regulation No. 401/2015 Coll.

In the case of bottom sediments, the pollution of the Elbe and bottom sediments is already occurring in the form of drainage of polluted groundwater from the tailings and its surroundings, which are polluted with metals and other pollutants. These metals oxidize in surface water and are sorbed to bottom sediments, thus contributing to an increase in the total content of the given indicator in the bottom sediment. From the balance point of view, the implementation of the project will replace one source of pollution (the existing tailings) with another source (wastewater), which will also have more favourable characteristics (lower pollution and flow). From this point of view, the implementation of the project will have **a neutral to positive effect on the quality of bottom sediments**. After the completion of the remediation and reclamation and the termination of the operation of the project, the outflow of polluted water from the sludge pond and the discharge of wastewater into the Elbe will completely cease, which will have **a clearly positive effect** on the quality of bottom sediments.

The affected surface water body "HSL_1180 Elbe from the Chrudimka River to the Doubrava River" is defined as a heavily affected water body, the status of which is generally assessed as unsatisfactory. From the point of view of chemical status, the formation is classified as "not achieving good status" due to the occurrence of above-limit values of substances from the group of polycyclic aromatic hydrocarbons and perfluorooctane sulfonic acid. These substances and other other priority substances will not be used during the operation of the project, so the implementation of the project cannot worsen its chemical status or be an obstacle to the achievement of any objectives for improving its chemical status. In the case of ecological potential, the body is classified as "damaged potential" due to, among other things, unsatisfactory parameters of both the general physicochemical and biological elements. Possible impacts of the project can be seen in the area of the general physico-chemical component due to the discharge of wastewater into surface water. It can be stated that the impact on individual surface water quality indicators will be minimal without the possibility of causing deterioration or failure to achieve the good potential of the surface water body concerned. In addition, this factor will only operate for a limited period of time (the operation of the project is planned for 25 years).

From the point of view of water planning (Act No. 254/2001 Coll., Directive No. 2000/60/EC), the project will not cause deterioration or failure to achieve good chemical status and ecological potential of the surface water body "HSL_1180 Elbe from the Chrudimka River to the Doubrava River". The implementation of the project will in no way result in a negative change in the quantitative and qualitative status of the surface water body concerned, nor will it be an obstacle to the achievement of the objectives arising from the Water Framework Directive. In the case of the implementation of the project, **a slight improvement** in the quality status of the affected surface water body can be expected.

Groundwater monitoring takes place at the site. In the previous phases of the preparation of the plan, the use of groundwater at the site for the needs of mining and operation of the processing plant was considered (see below). In connection with the expected direct impact on groundwater, it was proposed to supplement the existing monitoring system with another network of observation boreholes after the discharge of spoil heaps as part of the monitoring of the future mining waste disposal site and with regard to the evaluation of the impact of mining activities on the groundwater regime. This was taken into account in the previous notification. With regard to the fact that the project will not directly affect groundwater, it is not necessary to fundamentally modify the existing water monitoring system. For the purposes of assessing the impact of mining and remediation of tees on the groundwater regime, it is recommended to continue with the current scope of monitoring for the entire duration of the project and for another 5 years after its completion. After the implementation of the central retention pit of the drainage system, we recommend the inclusion of this object in the monitoring system. The conditions for water monitoring are given in Part D.IV.

On the basis of the above, and assuming the implementation of the proposed measures according to Chapter D.IV., the impact of the project on water quality is evaluated as **insignificant** during the period of implementation **of the project and favourable** in the phase of termination of operation and remediation and reclamation of the affected area.

Changes in resource yield and changes in groundwater level

In the screening phase, it was assumed that for the needs of mining and operation of the processing plant, an own source of service water would be built, namely two collection boreholes in the north-western part of the mining area. Pumping of 500 m3/day was expected. At this stage, the above drawdown is no longer taken into account. The water demand will be covered by supplies from the power plant. Groundwater will therefore not be used during the operation of the project.

In the area of the tailings, precipitation currently contributes to the formation of groundwater (3.1 l/s), which is then drained by the Elbe and partly directed directly into the Elbe in the form of surface runoff. After the completion of the remediation and reclamation, the bodies of the spoil heaps will be completely isolated, so that rainwater falling on the bodies of the spoil heaps will not participate in the formation of groundwater as is currently the case. The implementation of the project in the area will result in a partial reduction of groundwater generation by 3.1 l/s, however, this effect will be negligible from the point of view of the hydrogeological conditions of the groundwater aquifer in question. The mining area occupies a negligible part in the area of the affected aquifer or groundwater body of the upper layer "11400 - Quaternary of the Elbe to Týnec", so that there remains sufficient area for the infiltration of rainwater and the maintenance of groundwater formation, and thus the preservation of the current quantitative state of the body. In addition, the tailings are located near the Elbe in the groundwater drainage zone, so groundwater is drained into the surface waters of the Elbe in a relatively short period of time. Due to the area of the processing plant, the use of rainwater from this area will be equally negligible, and in addition, the area of the plant is now mostly paved and all rainwater is therefore not absorbed.

In relation to water planning (Act No. 254/2001 Coll., Directive No. 2000/60/EC), the implementation of the project will not change the quantitative status of the groundwater body concerned (11400 - Quaternary of the Elbe to Týnec), the status of which is evaluated as good. The implementation of the project will not be an obstacle to the achievement of the objectives arising from the Water Framework Directive.

The implementation of the project will have **a nesignificant** impact on the regime and quantity of surface water.

Impact on surface runoff and river network change

At present, there are no permanent watercourses or surface water bodies in the area of interest. Rainwater is mostly absorbed and becomes part of groundwater. During more intense rains, surface runoff also occurs, and the water is then drained through small streams in the immediate vicinity into the Elbe.

The HEIS information system records a small watercourse (ID 107370000100, see chapter C.1.1) at the top of the tailings, but it does not actually exist in the field.

During the operation of the project, industrial (84 m3/day) and sewage (42 m3/day) wastewater will be generated. These will be discharged into the Elbe after appropriate cleaning. On average, about 1.5 l/s of wastewater will be discharged, which is a negligible value in the total flow of the Elbe. In addition, these will be waters that flow into the Elbe in a different form now, so there will be no change in the flow of the Elbe from the balance point of view.

During the operation of the project, the implementation of the project will be slightly negative in relation to the overall surface water balance. As part of the cooling of the technology, industrial water will evaporate from the cooling towers in the volume of 1,905 m3/day (22 l/s), which currently flows into the Elbe. With an average annual flow of the Elbe Qa = 59.7 m3/s, this value is completely negligible and does not affect the flow conditions of the Elbe in any way. This effect is only temporary for the duration of the intent's operation.

After the completion of the remediation and reclamation of the tailings, the bodies of the spoil heaps will be completely isolated and the outflow of rainwater will be mainly in the form of surface runoff, mainly from the retention reservoir (polder). Only water from the outer edges will flow into the vicinity of the spoil heaps, where it will be absorbed using infiltration ditches. However, there will be no significant change in the balance sheet of the Elbe subsidy. The retention reservoir created as part of the remediation of the area between the third and first mining blocks will perform the function of transforming surface water runoff into the Elbe during torrential rainfall, the maximum safe capacity of water captured in the dry polder will be 17,000 m3 and the retention capacity will be sufficient to retain 15 minutes of rain of a periodicity of 20 years (rain intensity 251 l/s/ha, Inflow to the reservoir ≈19 m3/s, outflow ≈75 l/s).

In the notification of the plan, 2 sub-variants were considered, differing in the implementation of the reclamation of the area in terms of rainwater management (R1 – creation of a water area in the central part of the territory, R2 – Remediation and reclamation without this water area). At the same time, it was stated that the resulting design could also be a combination of these variants, which would suppress their partial disadvantages and take into account the advantages. This is the case of the proposed solution in the EIA documentation phase. The proposal for remediation and reconciliation of the area is a combination of variants

R1 and R2, which aims to support the creation of wetland communities and the retention of rainwater in the area. From the first option, the dam has been preserved, which had the task of creating a permanent water area in the central part of the territory. At the same time, the proposed dam has a bottom outlet and the central depression will thus serve as a dry polder that will retain torrential rainfall and release it gradually. The concept of the arrangement of the valley bottom is then taken over from the second option – when a smaller recess below the ground level (0.5 – 1 m) is created as part of the technical reclamation around the riverbed draining rainwater leading through the central depression in the south-west direction to the dam. The formation of shallower depressions creates periodically flooded pools retaining rainwater in the area. This will enable the formation of hygrophilous or wetland communities with the assumption of support for particularly amphibious animals.

The Elbe River itself will not be affected in any way, either by physical disruption of its bed, nor by a significant impact on the flow in the Elbe in the sense of its substantial decrease or increase.

Details on extreme hydrological conditions are given in Chapter D.II.

Overall, the impact on surface runoff and change in the river network is evaluated as **insignificant**.

5. Soil Influences

Occupation of ZPF

The area affected by the determination of the DP has an area of 119.3475 hectares and, according to the land data from the Land Registry, almost all of it lies outside the agricultural land fund (ZPF) and outside the land designated for forest functions (PUPFL).

Only at the northern edge and in the eastern part does the mining area extend into the ZPF land. Specifically, these are plots of land No. 1004, 1013 and 662/1 in the cadastral area. Trnávka (see Picture no. 39), the affected area is about 5.58 hectares. Administratively, therefore, the mining area on the land of the ZPF will be demarcated and most of this area will also be occupied by the ZPF. In order to implement the plan, it will be necessary to apply to the authority for the protection of the ZPF for approval of the proposal to establish a DP for the area of the ZPF of approximately 5.58 ha.

In the DP area there is BPEJ 3.19.11, which is classified in the third class of protection according to Decree No. 48/2011 Coll., on the determination of protection classes, and BPEJ 3.55.00, which is classified in the IV protection class.

Physical intervention as part of the implementation of the plan will take place in the case of plot No. 662/1 in the cadastral area of Trnávka. This land will be used for the construction of a mining waste dump. Prior to the actual opening of the deposit, the area will be prepared on the land and mining waste will be deposited there in an isolated repository in the initial phase. The area will thus become part of the future mining waste repository. No other solution is technically possible, because in the initial phase of the implementation, the area of the current tailings will not yet be available for the disposal of mining waste. The intention will result in the permanent occupation of practically the entire part of the plot of land No. 662/1 lying in the proposed DP, i.e. 5.37 ha. However, only part of this area is covered with topsoil and is farmed. It is a part with an area of 2.77 hectares, where BPEJ 3.19.11 is demarcated in the third protection class (the beige coloured area in the picture above). The remaining part of the land in question lies below the current tailings and is therefore permanently unusable for agricultural purposes, even though it is protected as a ZPF (hatched part without background in the picture above)

With regard to the fact that the plot of land No. 662/1 in the cadastral area. Trnávka is registered in the Land Register as an agricultural land fund, and it will be necessary to permanently remove the affected part of the land from the ZPF before mining activities are permitted.

The topsoil and any subsoil from this area will be hidden separately and deposited in the landfill on the outskirts of this area or on the landfill west of the DP. The intention of the notifier is to use the topsoil and subsoil for reclamation work. This plan requires the approval of the ZPF protection authority.

On the basis of the above, the impact associated with the annexation of the ZPF is assessed as **slightly unfavourable**. In the context of the whole project, however, the impact is acceptable, provided that the authority for the protection of the ZPF agrees. Administratively, the ZPF land with an area of 5.58 hectares will be incorporated into the proposed DP with a total area of approximately more than 119 hectares. However, out of the 5.58 hectares, an area of 2.77 hectares of ZPF with class III protection will be physically affected, where existing agricultural management will be prevented. The remaining part of the ZPF land cannot be farmed at present or would not be possible in the future, this part lies in the area of the current tailings and there is no BPEJ demarcated there.

The impact assessment also takes into account the fact that the entire processing plant with an area of another 27 hectares is located outside the ZPF in the area of a brownfield, which is desirable from the point of view of the protection of the ZPF.

Occupation of PUPFL

The project will not affect forest land intended for the performance of forest functions.

The impact associated with the occupation of PUPFL is evaluated as **zero.**

Effects on soil cleanliness

A negative impact on the soil could only occur in a state of disrepair. Under normal operating conditions, the project will not have a significant impact on soil cleanliness. Soil in the vicinity of tailings must not be contaminated with oil substances during overburden work or mining. The same applies to the operation of trucks transporting extracted raw materials and materials for remediation. Provided that the correct working procedures and instructions concerning the operation of the machinery are followed and the procedures given by the emergency plan (in the event of an oil spill) are followed, the project does not create a presumption of soil contamination.

The facility must have an emergency plan in place that also addresses oil spills. The processing plant will be operated under the integrated permit regime, where all aspects related to non-standard conditions and risks of leakage of harmful substances will be addressed.

A certain risk is posed by the removal of tailings material during mining outside the current tailings into the surrounding agricultural lands. It should be noted that this risk is already low in principle due to the proposed drainage system, the naturally high humidity of the tailings material, the annual overburden procedures and the proposed anti-dust measures. In order to further minimize this risk, it is proposed to develop a detailed technological guideline for the next stages of the implementation documentation, which will specify the technological procedures of mining to minimize the risk of carrying the tailings material away from the mining area by water or wind erosion. It will also include a proposal for continuous monitoring of the condition of the mined part of the tailings in terms of its humidity and stability.

The current unsecured area of the tailings is a source of contamination of groundwater and surrounding soil caused by seepage water. This risk will be eliminated by the implementation of the project.

The impact of the project on soil cleanliness will be **insignificant if the above measures are followed**, but it can be evaluated as favourable if the removal of the source of soil contamination in the area is taken into account.

At the same time, there is a certain uncertainty in the assessment of this impact, analogous to the assessment of the impact on water quality (see Chapter D.I.4).

6. Effects on natural resources

The extraction of manganese ore, which is also waste from the former mining and processing of mineral resources, will have an impact on the reserves of this raw material evaluated at the deposit. This results from the nature of mining activity, the purpose of which is to extract a source of raw materials. Such an effect cannot, in principle, be evaluated unfavorably. In addition, in this case, the deposit of anthropogenic origin and the extracted raw material are waste, so de facto it is the reuse or recycling of waste. In principle, such use of the raw material means that in the global context this raw material does not have to be obtained from primary (natural) deposits, which would most likely mean significantly greater environmental negative impacts. Due to the size of the deposit and world consumption, it is assumed that manganese from the deposit and products from it will be used on the global market.

Possible impact on other natural resources (water, soil etc.) is evaluated in separate chapters. No other effects on natural resources described in other chapters are expected.

In terms of size and resulting significance, the impact is evaluated **as favourable,** as it means environmentally safe use of the tailings, which is also a deposit of reserved minerals, and savings of primary natural raw material.

7. Impacts on biodiversity

The impact on biodiversity is evaluated on the basis of botanical and zoological surveys, which are summarized in a biological assessment (Véle, 2022). In addition to the report itself, the details of the survey are summarized in Part C.

The survey of the area was focused on determining the current biological status of the site and the occurrence of specially protected species of plants and animals, listed in the Decree of the Ministry of the Environment No. 395/1992 Coll., as amended, to Act No. 114/1992 Coll., on Nature and Landscape Protection, as amended, and other species of conservation importance.

The results of the botanical and zoological surveys were obtained during fieldwork that took place from June to October 2016, from March to August 2017, from March to October 2019 and their updates carried out in 2021 and 2022. In addition to the data obtained during the survey, literary data on the site, data from the study Janda, P., 2019: Biological surveys and assessment of the site for the Recycling of the Chvaletice-Trnávka tailings, and data from the Nature Conservation Finding Database were also used.

Destruction or damage to populations or individuals of rare and specially protected plant species

The results of the botanical survey are presented in the biological assessment (Annex No. 5).

During the survey, the presence of 335 plant taxa was found. The only specially protected species found is the European yew on the premises of the plant. These are individuals coming from artificial planting. The Red List of Plants of the Czech Republic includes goosefoot (C4a), crooked sedge (C3), leaf sedge (C3) and lesser whiteleaf (C3), broad-leaved helleborine (C4a), spurge (C4a), centaury (C4a) and willow-leaved oman (C4a).

According to the protection categories, these are endangered plants with a weaker but permanent decline (C3) and rarer plants requiring further attention (C4a). These are not categories C1 and C2, i.e. critically or severely endangered with a strong and permanent decline in representation in the Czech Republic.

It is assumed that due to gradual mining and continuous reclamation, the occurrence of the vast majority of the above-mentioned species will be maintained at the site. This is also due to the fact that humus soil hidden from the upper layers of the tailings will be immediately transported for the reclamation of spoil heaps. At this stage of the preparation of the project and in view of the above, no targeted transfers of these plants are proposed. An exception is the broad-leaved helleborine whose occurrence was found in the north-eastern part of the plant construction site (see Chapter D.IV). However, in the case of requirements of nature conservation authorities, transfers of other plant species (in the area of tailings) are also possible and can be included in the protective measures in the next phases of the preparation of the plan.

The impact on rare and specially protected plant species is evaluated as **insignificant**.

Destruction or damage to populations or individuals of rare and specially protected animal species

Specially protected species

An overview of all animal species found is given in the biological assessment and also in Part C of this documentation. During the inventory surveys, 23 specially protected animal species were found. Their list and categories of protection according to Decree No. 395/1992 Coll. No. 114/1992 Coll. are listed in the following table. An approximate plot of the specially protected animal species found on the map is shown in the picture in Part C of this documentation (Biodiversity

Fauna and flora

A biological assessment of the project was prepared for the biota impact assessment (, Annex 5). The survey of the territory was focused on determining the current biological state of the site and the occurrence of specially protected species of plants and animals, listed in the Decree of the Ministry of the Environment No. 395/1992 Coll., as amended to Act No. 114/1992 Coll., on Nature and Landscape Protection, as amended, and other species of conservation importance.

The biological survey shows that the following biotopes are found in the territory:

Table No. 87: List of habitats in the project area

Habitat code	Biotope
K3	High mesophilic and xerophilous shrubs
T1.1	Mesophilic oat meadows and highly influenced biotopes by humans
X2	Intensively farmed fields
X3	Extensively farmed fields
X5	Intensively farmed meadows
X7A	Ruderal herbaceous vegetation outside settlements, stands of conservation importance
X7B	Ruderal herbaceous vegetation outside settlements, other stands
X9B	Forest crops with non-native deciduous trees
X12B	Raids of pioneer trees, other stands
X13	Non-forest tree plantings outside settlements
x14	Watercourses and reservoirs without vegetation of conservation importance

During the surveys, the presence of syntaxons *Arrhenatherion elatioris,* Berberidion vulgaris, Phragmitetum communis *variant* Urtica dioica *was detected.*

The results of both the botanical and zoological surveys were found during the fieldwork that took place from June to October 2016, from March to August 2017, from March to October 2019 and their updates carried out in 2021 and 2022. In addition to the actual data obtained during the survey, literary data about the locality were also used, data from the study Janda, P., 2019: Biological surveys and assessment of the site for the Recycling of the Chvaletice-Trnávka tailings project, and data from the Finding Database of Nature Protection.

For conservationally important plant species and selected invertebrate taxa, the tables show the category of protection according to Decree No. 395/1992 Coll. (O – endangered species, SO – highly endangered species, KO – critically endangered species) and according to the Red List (NT – almost endangered, LC – little affected, C2 – highly endangered, C3 – endangered, C4a- rarer taxon requiring further attention - less endangered, C4b- rarer taxon requiring further attention – insufficiently studied, CR – critically endangered, EN – endangered, VU – vulnerable, NT – near threatened).

<u>O – Endangered species</u>

A species of plant or animal that is endangered or rare, scientifically, or culturally very important and according to Decree No. 395/1992 Coll. classified as an endangered species.

<u>SO – highly endangered species</u>

A species of plant or animal that is endangered or rare, scientifically, or culturally very important and according to Decree No. 395/1992 Coll. classified as a highly endangered species.

<u>KO – critically endangered species</u>

A species of plant or animal that is endangered or rare, scientifically, or culturally very important and according to Decree No. 395/1992 Coll. classified as a critically endangered species.

<u>C1 – critically endangered vascular plant taxa of the Czech Republic</u>

Very rare and endangered taxa with occurrence limited to one or a few local populations are considered critically endangered. Their numbers are less than 10% of their previous representation. Without effective protection, these taxa would most likely soon disappear from the flora of the Czech Republic.

C2 – highly endangered vascular plant taxa of the Czech Republic

Plants with demonstrable and permanent decline are considered to be highly endangered, their status has decreased to 50% of the original representation. They are not in danger of current disappearance, but without proper protection they can get into a state of critical danger.

C3 – endangered vascular plant taxa of the Czech Republic

These are plants with a weaker, but persistent retreat. The reduction in their incidence is between 50 and 80% of the original representation.

C4 - rarer taxa of vascular plants in the Czech Republic requiring further attention

This group includes vascular plant species and subspecies requiring further attention as they can be expected to be endangered in the short term (C4a). At the same time, this category also includes insufficiently studied taxa for which it is not yet possible to determine the degree of threat (C4b).

Critically Endangered (CR)

A taxon is critically endangered if the best available evidence indicates that it meets any of the criteria A through E for critically endangered taxa and is therefore considered to face an extremely high risk of extinction in the wild.

Endangered (EN)

A taxon is endangered if the best available facts indicate that it meets any of the criteria A through E for endangered taxa and is therefore considered to face a very high risk of extinction in the wild.

Vulnerable (VU)

A taxon is vulnerable if the best available evidence indicates that it meets any of the criteria A to E for vulnerable taxa (see Part V) and is therefore considered to be at great risk of extinction in the wild.

Near Threatened (NT)

A taxon is near threatened if it has been assessed against these criteria and is not currently classified as 'critically endangered', 'endangered' or 'vulnerable', but it almost meets those criteria or is likely to meet them in the near future.

Flora of the area of interest

During the survey, the presence of 335 plant taxa was detected. The only specially protected species found is the red yew. These are individuals originating from artificial planting. The Red List of Plants of the Czech Republic includes Blitum bonus-henricus (C4a), Carex Curvata (C3), Silene Baccifera (C3) and Filago arvensis (C3), Filago minima (C3), Epipactis helleborine (C4a), Euphorbia waldsteinii (C4a), Centaurium erythraea (C4a), Inula salicina (C4a).

The following table provides an overview of all plant species found in the entire area of the project, i.e. in the area of mining and processing plant.

Table No. 88: List of plant taxa found

Latin name	**English name**	**Protection**
Acer campestre	Field maple	
Acer negundo	Ash maple	

Latin name	**English name**	**Protection**
Acer platanoides	Norway maple	
Acer pseudoplatanus	sycamore maple	
Aegopodium podagraria	ground elder	
Aesculus hippocastanum	horse chestnut	
Agrostis capillaris	colonial bent	
Agrostis stolonifera	creeping bentgrass	
Achillea millefolium	milfoil	
Ailanthus altissima	tree of heaven	
Alchemilla sp.	Lady´s Mantle	
Alliaria petiolate	garlic mustard	
Allium oleraceum	wild garlic	
Allium scorodoprasum	rocambole	
Alnus glutinosa	common alder	
Alopecurus pratensis	meadow foxtail[	
Amaranthus retroflexus	red-root amaranth	
Amaranthus retroflexus	red-root amaranth	
Amorpha fruticose	Desert false indigo	
Anagallis arvensis	scarlet pimpernel	
Anthemis arvensis	corn chamomile	
Anthoxanthum odoratum	sweet vernal grass	
Anthriscus nitidus		
Arabidopsis thaliana	thale cress	
Arctium lappa	greater burdock	
Arctium minus	lesser burdock	
Arctium tomentosum	woolly burdock	
Arrhenatherum elatius	bulbous oat grass	
Artemisia vulgaris	mugwort	
Astragalus glycyphyllos	liquorice milkvetch	
Avenella flexuosa	wavy hair-grass	
Ballota nigra	black horehound	
Bellis perennis	Daisy	
Betula pendula	silver birch	
Blitum bonus-henricus	Good-King-Henry	C4a
Bromus hordeaceus	Soft brome	
Bromus sterilis	barren brome	
Bromus tectorum	cheatgrass	
Bupleurum falcatum	cheatgrass sickle-leaved hare's-ear	
Caduus acanthoides	plumeless thistle	
Calamagrostis epigejos	wood small-reed	
Calystegia sepium	hedge bindweed	
Campanula patula	spreading bellflower	
Campanula persicifolia	peach-leaved bellflower	

Latin name	**English name**	**Protection**
Capsella bursa pastoris	shepherd's purse	
Cardaria draba	hoary cress	
Carduus pratensis		
Carex brizoides	quaking sedge	
Carex contigua		
Carex curvata		C3
Carex hirta	hairy sedge	
Carex muricata	rough sedge	
Carlina vulgaris	carline thistle	
Centaurea jacea	brown knapweed	
Centaurea stoebe	spotted knapweed	
Centaurium erythraea	common centaury	C4a
Cerastium arvense	field mouse-ear	
Cerastium holosteoides	common mouse-ear chickweed	
Cichorium intybus	Common chicory	
Cirsium arvense	Canada thistle	
Cladophora glomerata		
Clinopodium vulgare	wild basil	
Convolvulus arvensis	field bindweed	
Conyza canadensis	Canadian horseweed	
Cornus sanguinea	common dogwood	
Corylus avellana	common hazel	
Cotoneaster dammeri	bearberry cotoneaster	
Crataegus monogyna	common hawthorn	
Crataegus sp.	littlehip hawthorn	
Crepis biennis	rough hawksbeard	
Cytisus scoparius	common broom	
Dactylis glomerata	orchard grass	
Daucus carota	wild carrot	
Dianthus carthusianorum	Carthusian pink	
Digitalis purpurea	foxglove	
Digitaria sanguinalis	hairy crabgrass	
Dipsacus fullonum	wild teasel	
Draba verna	common whitlowgrass	
Dryopteris filix-mas	male fern	
Echinochloa crus-galli	cockspur grass	
Echinops exaltatus	Russian globe thistle	
Echinops sphaerocephalus	glandular globe-thistle	
Echium vulgare	viper's bugloss	
Elymus caninus	bearded couch	
Elytrigia repens		
Epilobium angustifolium		
Epilobium ciliatum	fringed willowherb	

Latin name	**English name**	**Protection**
Epilobium hirsutum	great willowherb	
Epilobium parviflorum	hoary willowherb	
Epilobium tetragonum	square stalked willow herb	
Epipactis helleborine	broad-leaved helleborine	C4a
Equisetum arvense	field horsetail	
Erigeron acris	bitter fleabane	
Erigeron annuus	annual fleabane	
Erodium cicutarium	common stork's-bill	
Erysimum odoratum		
Euonymus europaeus	European spindle	
Eupatorium cannabinum	hemp-agrimony	
Euphorbia cyparissias	cypress spurge	
Euphorbia waldsteinii		C4a
Fallopia convolvulus	black-bindweed	
Festuca ovina	sheep's fescue	
Festuca pratensis	meadow fescue	
Festuca rubra	red fescue	
Filago arvensis		C3
Filago minima		C3
Filipendula ulmaria	meadowsweet	
Fragaria officinalis		
Fraxinus excelsior	European ash	
Fraxinus ornus	manna ash	
Galeopsis speciosa	large-flowered hemp-nettle	
Galeopsis terahit	common hemp-nettle	
Galinsoga parviflora	potato weed	
Galium album	white bedstraw	
Galium aparine	Cleavers	
Galium mollugo	hedge bedstraw	
Galium sylvaticum	Scotch mist	
Galium verum	lady's bedstraw	
Germanic genist		
Geranim pyreneicum	hedgerow cranesbill	
Geranium pratensis	meadow crane's-bill	
Geranium pusilum	small-flowered crane's-bill	
Geranium robertianum	herb-Robert	
Geum urbanum	wood avens	
Gnaphalium sylvaticum	heath cudweed	
Heracleum spondylium	hogweed	
Hieracium bauhini		
Hieracium pilosella	mouse-ear hawkweed	
Hieracium piloselloides	tall hawkweed	
Hieracium sp.		

Latin name	English name	Protection
Hollcus lanatus	Yorkshire fog	
Humulus lupulus	common hop	
Hypericum perforatum	St John's wort	
Hypochaeris radicata	catsear	
Chaerophyllum temulum	rough chervil	
Chelidonium majus	greater celandine	
Chenopodium album	lamb's quarters	
Chrysanthemum leucanthemum		
Impatiens glandulifera	Himalayan balsam	
Impatiens noli-tangere	touch-me-not balsam	
Impatiens parviflora	small balsam	
Inula conyzae		
Inula salicin		C4a
Juglans directed		
Juncus conglomeratus		
Juncus effusus	common rush	
Juncus tenuis	path rush	
Juniperus x media		
Knautia arvensis	field scabious	
Lactuca muralis		
Lactuca seriola	prickly lettuce	
Lamium albums	white nettle	
Lamium amplexicaule	common henbit	
Lamium purpureum	red dead-nettle	
Larix decidua	European larch	
Lathyrus pratensis	meadow vetchling	
Lathyrus sylvestris	flat pea	
Lathyrus tuberosus	tuberous pea	
Lavatera thuringiaca	garden tree-mallow	
Lemna minor	common duckweed	
Leontodon autumnalis	autumn hawkbit	
Leucanthemum ircutianum	oxeye daisy	
Libanotis pyrenaica		
Ligustrum vulgare	wild privet	
Linaria vulgaris		
Lithospermum arvensis		
Lolium perennial		
Lonicera xylosteum	fly honeysuckle	
Lotus corniculatus	common bird's-foot trefoil	
Luzula luzuloides	white wood-rush	
Luzula multiflora	common woodrush	
Lychnis flos-cuckoos		
Lysimachia vulgaris	yellow loosestrife	

Latin name	**English name**	**Protection**
Lythrum salicaria	purple loosestrife	
Mahonia aquifolium		
Malus sp.	nokaidō	
Malva sylvestris	common mallow	
Matricaria recutita	chamomile	
Medicago lupulina	black medick	
Medicago sativa	lucerne	
Melandrium album	white campion	
Melilotus albus	honey clover	
Melilotus officinalis	sweet yellow clover	
Microrrhinum minus		
Microthlaspi perfoliatum		
Milium effusum	American milletgrass	
Mycelis muralis	wall lettuce	
Myosotis arvensis	field forget-me-not	
Myosoton aquaticum	water chickweed	
Oenothera biennis	common evening-primrose	
Origanum vulgare	Oregano	
Oxalis latifolia	garden pink-sorrel	
Papaver rhoeas	common poppy	
Papaver rhoeas		
Pastinaca sativa	parsnip	
Persicaria lapathifolia	pale persicaria	
Petrorhagia proliferates		
Peucedanum cervaria		
Phalaris arundinacea	reed canary grass	
Philadelphus coronarius	English dogwood	
Phleum pratense	Timothy	
Phragmites australis	common reed	
Picea abies	Norway spruce	
Picea pungens	blue spruce	
Pimpinella saxifraga	burnet-saxifrage	
Pinus mugo	dwarf mountain pine,	
Pinus nigra	Austrian pine	
Pinus strobus	eastern white pine	
Pinus sylvestris	Scots pine	
Plantago lanceolata	ribwort plantain	
Plantago major	broadleaf plantain	
Plantago media	hoary plantain	
Poa angustifolia		
Poa annua	annual meadow grass	
Poa compressa	Canada bluegrass	
Poa nemoralis	wood bluegrass	

Latin name	**English name**	**Protection**
Poa palustris	fowl bluegrass	
Poa vulgare		
Polygonum arenastrum	equal-leaved knotgrass	
Polygonum aviculare	common knotgrass	
Populus alba	silver poplar	
Populus canadensis		
Populus nigra	black poplar	
Populus tremula	common aspen	
Portulaca oleracea	common purslane	
Potentilla anserina	silverweed	
Potentilla argentea	hoary cinquefoil	
Potentilla erecta	Common tormentil	
Potentilla heptaphylla		
Potentilla intermedia		
Potentilla reptans	creeping cinquefoil	
Prenanthes purpurea	rattlesnake root	
Prunella vulgaris	common self-heal	
Prunus avium	wild cherry	
Prunus cerasifera	cherry plum	
Prunus insititia		
Prunus mahaleb	mahaleb cherry	
Prunus spinosa	blackthorn	
Pseudotsuga menziesii	Douglas spruce	
Pyrus pyraster	European wild pear	
Quercus cerris	Turkey oak	
Quercus palustris	pin oak	
Quercus robur	pedunculate oak	
Quercus rubra	northern red oak	
Ranunculus acris	meadow buttercup	
Reynoutria japonica	Japanese knotweed	
Robinia pseudoacacia	black locust	
Dog pink		
Rosa dumalis	glaucous dog rose	
Rubus caesius	European dewberry	
Rubus fruticosus agg.		
Rubus sp.		
Rumex acetosa	common sorrel	
Rumex acetosella	red sorrel	
Rumex crispus	curly dock	
Rumex obtusifolius	bitter dock	
Rumex thyrsiflorus	compact dock	
Salix × sepulcralis	white weeping willow	
Salix albums		

Latin name	English name	Protection
Salix caprea	goat willow	
Salix fragilis		
Salvia pratensis	meadow clary	
Sambucus nigra	elderberry	
Sanguisorba minor	salad burnet	
Sanguisorba officinalis	great burnet	
Saponaria officinalis	common soapwort	
Scrophularia nodosa	woodland figwort	
Securigera varia	crownvetch	
Sedum acre	goldmoss stonecrop	
Sedum album	white stonecrop	
Senecio jacobaea	ragwort	
Senecio ovatus	wood ragwort	
Senecio viscosus	sticky ragwort	
Senecio vulgaris	groundsel	
Setaria pumila	yellow foxtail	
Setaria viridis	green foxtail	
Silene baccifera		C3
Silene dioica	red campion	
Silene latifolia subsp. alba	white campion	
Silene nutans	Nottingham catchfly	
Silene vulgaris	bladder campion	
Sinapis arvensis	charlock mustard	
Sisymbrium loeselii	small tumbleweed mustard	
Solanum nigrum	European black nightshade	
Solidago canadensis	Canada goldenrod	
Solidago gigantea	tall goldenrod	
Solidago virgaurea		
Sonchus oleraceus	common sowthistle	
Sorbus aucuparia	rowan	
Spiraea × vanhouttei		
Stachys sylvatica	hedge woundwort	
Medium stellaria		
Symphytum officinale	comfrey	
Syringa vulgaris	common lilac	
Tanacetum vulgare	common tansy	
Taraxacum sect. ruderaria		
Taxus baccata	yew	§SAT
Thlaspi arvense	field pennycress	
Thymus serpyllum	Breckland thyme	
Tilia cordata	small-leaved lime	
Tilia euchlora		
Tilia platyphyllos	large-leaved lime	

Latin name	English name	Protection
Torilis japonica	erect hedgeparsley	
Tragopogon dubium		
Tragopogon orientalis	Oriental goat's beard	
Tragopogon pratensis	Jack-go-to-bed-at-noon	
Trifolium arvense	hare's-foot clover	
Trifolium aureum	large hop trefoil	
Trifolium campestre	hop trefoil	
Trifolium dubium	lesser trefoil	
Trifolium pratense	red clover	
Trifolium repens	white clover	
Tripleurospermum inodorum	scentless false mayweed	
Tussilago farfara	coltsfoot	
Ulmus glabra	wych elm	
Ulmus laevis	European white elm	
Urtica dioica	common nettle	
Valeriana officinalis	Valerian	
Verbascum densiflorum	denseflower mullein	
Verbascum nigrum	black mullein	
Verbascum thapsus	great mullein	
Veronica arvensis	wall speedwell	
Veronica chamaedrys	germander speedwell	
Veronica officinalis	heath speedwell	
Veronica serpyllifolia	thyme-leaved speedwell	
Viccia sativa	common vetch	
Vicia angustifolia		
Vicia cracca	tufted vetch	
Vicia hirsuta	hairy tare	
Vicia sepium	bush vetch	
Vicia tetrasperma	smooth tare	
Vinca minor	lesser periwinkle	
Viola arvensis	field pansy	

Fauna of the area of interest

As part of the biological assessment (Véle, 2022 – Annex No. 5), a zoological survey of the site was also carried out.

Invertebrates

The presence of invertebrates was detected by individual collection, ground traps, white bowls, laying of food baits and sweeping of vegetation.

When surveying invertebrates, 7 species were recorded, which are listed in the Red List. Two species are critically endangered (CR), one species is endangered (EN) and four species are vulnerable (VU).

The most important find is *Hedychridium krajniki*, which occurs only in very good sandy and loess localities. Other gerbil bioindicator species listed in the Red List *Crossocerus wesmaeli* and *Tachysphex obscuripennis*, *Hedychrum nobile* and *Priocnemis minuta* were found at the site. Other gerbil-loving species worth mentioning *include Crossocerus exiguus, Nysson trimaculatus* and *Lasioglossum politum*.

Very significant was the discovery of a rare black mud daubers *Pemphredon austriaca*, which is very rarely collected, perhaps even overlooked because of the hidden way of life. This species probably nests only in the oak gills.

Among the bees included in the Red List, only the species *Epeolus variegatus* was recorded at the site. Tailings are important especially in terms of the occurrence of goldfinches, rakes and handymen. They are not so important for bees, because there are not as many plants that bees are specialized in, as is the case in natural sandy biotopes.

Of the specially protected invertebrates, the occurrence of ants of the genus *Formica*, bumblebees of the genus *Bombus* and the black flower chafer have been confirmed in the area.

c) Aquatic invertebrates

The littoral zone of the Elbe in the examined section is completely modified by stone levelling. Due to this, it provides a minimum of habitats for aquatic organisms. Overall, the community of aquatic organisms is very poor. Only dragonflies were more represented. A total of 8 species have been recorded: Glossy butterfly *(Calopteryx splendens*), greater broadleaf (Ischnura elegans*), broad-legged broad-legged (Platycnemis pennipes*), black-breasted dragonfly *(Orthetrum cancellatum*), variegated awlgrass *(Aeschna mixta), copper shiner (*Cordulia aenea*), red shiner (*Pyrrhosoma nymphula*), red-eyed broad-leaved* (*Erythromma najas*). In all cases, these are common species.

Of the specially protected species, due to the nature of the locality, the species *Unio pictorum* and the yellow-legged wedge (*Gomphus Flavius*) can be found. However, these species were not detected during the basic survey.

In 2020, the revitalization carried out fundamentally changed the character of the blind arm, which is now flooded with sufficient water depth. In the coming years, an increase in the abundance and species diversity of aquatic invertebrates can be expected. Littoral parts can also be used, for example, for amphibian reproduction. Part of the mature trees growing along the banks of the arm was preserved, part was felled and left in the place where they serve for the development of insects. The retained trees were supplemented by planting young trees of suitable species composition. Despite the fact that some of them withered during the first years, it is a suitable measure to support biodiversity in the area.

In 2021 and 2022, no updates of hydrobiological surveys were carried out, the plan will not affect the sites that were the subject of these surveys.

d) Hymenoptera

Within the framework of the survey of selected groups of Hymenoptera squidge beetles at the site of the former tailings of the Chvaletice power plant, 51 species from 13 families were found: *Chrysididae, Vespidae*, Pompilidae, Tiphiidae, Mutillidae, Sapygidae, *Ampulicidae, Pompilidae,* Tiphiidae, *Mutillidae*, Ampulicidae, *Ampulicidae* (*Sphecidae*), *Crabronidae, Colletidae,* Halictidae, *Megachilidae,* Apidae.

Of the important species found at the site, these were mainly bioindicator species of drift sands.

Vertebrates

The presence of vertebrates was recorded using short-term traps, visually, acoustically, by means of residence signs, camera traps and a bat detector. Flying bird species were also recorded.

The survey confirmed the occurrence of 76 vertebrate species: 6 species of amphibians, 3 species of reptiles, 51 species of birds and 16 species of mammals. **Twenty recorded vertebrates are among the species specially protected.**

Table No. 89: List of vertebrate species found

	Latin name	Czech name	Protection
Amphibians	*Bufo bufo*	ropucha obecná	§O
	Bufotes viridis	ropucha zelená	§SAT
	Pelophylax esculentus	skokan zelený	§SAT
	Early Dalmatian	skokan štíhlý	§SAT
	Rana temporaria	skokan hnědý	
	Lissotriton vulgaris	čolek obecný	§SAT
Reptiles	*Anguis fragilis*	slepýš křehký	§SAT
	Lacerta agilis	ještěrka obecná	§SAT
	Natrix natrix	užovka obojková	§O
Birds	*Alauda arvensis*	skřivan polní	
	Ardea cinerea	volavka popelavá	
	Buteo buteo	káně lesní	
	Carduelis cannabina	konopka obecná	
	Carduelis carduelis	stehlík obecný	
	Carduelis chloris	zvonek zelený	
	Columba livia	holub skalní	
	Columba palumbus	holub hřivnáč	
	Corvus corax	krkavec velký	§O
	Coturnix coturnix	křepelka polní	§SAT
	Cuculus canorus	kukačka obecná	
	Cyanistes caeruleus	sýkora modřinka	
	Delichon urbica	jiřička obecná	
	Dendrocopos major	strakapoud velký	
	Dryocopus martius	datel černý	
	Emberiza calandra	strnad luční	§KO
	Emberiza citronella	strnad obecný	
	Erithacus rubecula	červenka obecná	
	Falco tinnunculus	poštolka obecná	
	Fringilla coelebs	pěnkava obecná	
	Garrulus glandarius	sojka obecná	
	Hirundo rustica	vlaštovka obecná	§O

	Latin name	Czech name	Protection
	Lanius collurio	ťuhýk obecný	§O
	Larus ridibundus	racek chechtavý	
	Locustella naevia	cvrčilka zelená	
	Luscinia megarhynchos	slavík obecný	O
	Motacilla albums	konipas bílý	
	Oriolus oriolus	žluva hajní	§KO
	Parus major	sýkora koňadra	
	Passer domesticus	vrabec domácí	
	perdix perdix	koroptev polní	§O
	Periparus ater	sýkora uhelníček	
	Phasianus colchicus	bažant obecný	
	Phoenicurus ochruros	rehek domácí	
	Phoenicurus phoenicurus	rehek zahradní	
	Phylloscopus collybita	budníček menší	
	Phylloscopus trochilus	budníček větší	
	Pica pica	straka obecná	
	Picus viridis	žluna zelená	
	Saxicola rubetra	bramborníček hnědý	§O
	Sitta europaea	brhlík lesní	
	Streptopelia decaocto	hrdlička zahradní	
	Sturnus vulgaris	špaček obecný	
	Sylvia atricapilla	pěnice černohlavá	
	Sylvia borin	pěnice slavíková	
	Sylvia communis	pěnice hnědokřídlá	
	Sylvia curruca	pěnice pokřovní	
	Troglodytes troglodytes	střízlík obecný	
	Turdus merula	kos černý	
	Turdus philomelos	drozd zpěvný	
	Turdus viscivorus	drozd brávník	
Mammals	*Apodemus sp.*	myšice	
	Arvicola terrestris	hryzec vodní	
	Capreolus capreolus	srnec obecný	
	Eptesicus serotinus	netopýr večerní	§SAT
	Erinaceus europaeus	ježek západní	
	Lepus europeaus	zajíc polní	
	Martes sp. z o.o.	kuna	
	Microtus sp.	hraboš	
	Mus musculus	myš domácí	
	Mustela nivalis	lasice kolčava	

	Latin name	**Czech name**	**Protection**
	Pipistrellus pipistrellus	netopýr hvízdavý	§SAT
	Sciurus vulgaris	veverka obecná	§O
	Sorex araneus	rejsek obecný	
	Sus scrofa	prase divoké	
	Talpa europaea	krtek obecný	
	Vulpes vulpes	liška obecná	

Specially protected species

During the inventory surveys, 23 specially protected animal species were found. Their list and categories of protection according to Decree No. 395/1992 Coll. to Act No. 114/1992 Coll. are listed in the table below. The approximate location of specially protected species in the area of interest is shown in the picture (**Chyba! Chybný odkaz na záložku.**).

Table No. 640: List of specially protected taxa found

Latin name	**Czech name**	**Protection**
Anguis fragilis	slepýš křehký	§SAT
Bombus sp.	čmelák	§O
Lissotriton vulgaris	čolek obecný	§O
Bufo bufo	ropucha obecná	§ The
Bufotes viridis	ropucha zelená	§SAT
Corvus corax	krkavec velký	§O
Coturnix coturnix	křepelka polní	§SAT
Emberiza calandra	strnad luční	§KO
Formica sp. z o.o.	mravenec	§O
Hirundo rustica	vlaštovka obecná	§O
Lacerta agilis	ještěrka obecná	§SAT
Lanius collurio	ťuhýk obecný	§O
Luscinia megarhynchos	slavík obecný	§O
Pipistrellus pipistrellus	netopýr hvízdavý	§SAT
Eptesicus serotinus	netopýr večerní	§SAT
Natrix natrix	užovka obojková	§O
Oriolus oriolus	žluva hajní	§KO
Oxyhyrea funesta	zlatohlávek tmavý	§O
perdix perdix	koroptev polní	§O
Early Dalmatian	skokan štíhlý	§SAT
Rana esculenta	skokan zelený	§SAT
Saxicola rubetra	bramborníček hnědý	§O
Sciurus vulgaris	veverka obecná	§O

§O – endangered species, §SO – highly endangered species, §KO – critically endangered species

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Table No. 108: List of specially protected animal species found

Latinský název	**Czech name**	**Protection**
Anguis fragilis	slepýš křehký	§SO
Bombus sp.	čmelák	§O
Lissotriton vulgaris	čolek obecný	§O

Latinský název	**Czech name**	**Protection**
Bufo bufo	ropucha obecná	§O
Bufotes viridis	ropucha zelená	§SO
Corvus corax	krkavec velký	§O
Coturnix coturnix	křepelka polní	§SO
Emberiza calandra	strnad luční	§KO
Formica sp.	mravenec	§O
Hirundo rustica	vlaštovka obecná	§O
Lacerta agilis	ještěrka obecná	§SO
Lanius collurio	ťuhýk obecný	§O
Luscinia megarhynchos	slavík obecný	§O
Pipistrellus pipistrellus	netopýr hvízdavý	§SO
Eptesicus serotinus	netopýr večerní	§SO
Natrix natrix	užovka obojková	§O
Oriolus oriolus	žluva hajní	§KO
Oxyhyrea funesta	zlatohlávek tmavý	§O
Perdix perdix	koroptev polní	§O
Rana dalmatina	skokan štíhlý	§SO
Rana esculenta	skokan zelený	§SO
Saxicola rubetra	bramborníček hnědý	§O
Sciurus vulgaris	veverka obecná	§O

Explanatory notes to the table: §O - endangered species, §SO - highly endangered species, §KO - critically endangered species

The following text is taken from the biological assessment and summarizes the identification of impacts on individual species and the significance of these influences. For more detailed information on individual species and their occurrence, see the annex (Véle, 2022).

The processor used the following scale for impact assessment:

+1 positive impact, enabling a future increase in the number of the species in the area of interest and its vicinity,
0 Zero impact
- 1 have a negative impact resulting in a decrease in the abundance of the species in the area of interest and its vicinity,
- 2 A strong negative impact resulting in a significant disruption of the local population.

Bumblebees *Bombus sp*.

- *Occurrence in the area of the project and its surroundings:* Bumblebees occur in almost the entire area of the area of interest, especially on meadow communities, forest roads, around the Elbe, etc.
- *Identification of impacts:* Bumblebees will be affected by the loss of habitats used for reproduction and foraging, as well as subsequent reclamation.
- *Significance of individual influences: At the time of implementation, the* effects can be evaluated with the degree of -1, as only a part of the habitat inhabited by them will be disturbed at a time. As a result of the plan, only local occupation of the biotope will take

place, bumblebees will find enough suitable areas in the area on areas that have not yet been mined or already reclaimed. Their abundant occurrence is also known from the surroundings of the project. In connection with mining activities, an increase in the number of nutrient plants can be expected, especially on unused edges of the territory, deforested parts of the territory and on reclaimed areas. At the time of mining and after its completion, the impact of the project will probably be zero (return to the current state).

- *Proposed mitigation measures:* Promote (e.g. by overseeding) the occurrence of nutrient plants (e.g. thistle, thistle, dandelion, clover, thyme, comfrey, ryegrass, nettle, sweet pea, etc.)

White spotted rose beetle

- *Occurrence in the area of the project and its surroundings:* A rare occurrence of goldenrods was recorded on the top plains in the eastern and western parts of the project. It also occurs in the wider surroundings of the project.
- *Identification of impacts:* Goldfinches will be affected by the loss of habitat used for foraging and reproduction, as well as by land reclamation.
- *Significance of individual influences:* During the preparatory work, when the existing habitat is gradually lost, the project will have a negative impact (-1), as only a part of the habitat inhabited by them will be disturbed at a time. Already during mining, it can be expected (in the marginal parts and in the continuously reclaimed areas) the creation of suitable conditions for the occurrence of goldenrods. In the future, the impact of the project can be assessed as zero (0).
- *Proposed mitigation measures:* None

Ants *Formica sp.*

- *Occurrence in the area of the project and its surroundings:* A total of 6 nests were found (one of them in the southern part of the project), the occurrence of other nests in the wider vicinity of the project is likely.
- *Identification of influences:* Ants will be affected by the loss of habitats used for both breeding and foraging/hunting for food.
- *Significance of individual impacts:* At the time of preparation of the plan, the negative impacts can be evaluated as -2, as most of the nests will be damaged/destroyed. This effect can be mitigated (-1) by a rescue transfer. In the course of mining (and as part of remediation and reclamation), new sunlit areas will be created on the edges of the forest or mined area, which will be suitable for the occurrence of ants. It is likely that these areas will be inhabited by ants in the future.
- *Proposed mitigation measures:* At least one year before the overburden, carry out an up-to-date survey of the occurrence of forest ants (ants sometimes move, disappear or create new nests), move endangered nests to a suitable area in the vicinity.

Edible Frog

- *Occurrence in the area of the project and its surroundings:* The occurrence of frogs was recorded in parts of the area adjacent to the Elbe River, i.e. at the boundaries of the area. Reproduction in the area of interest has not been confirmed, but it can be assumed in the vicinity of the project.
- *Identification of influences: Frogs* will be affected by the loss of habitat used for hunting for food (-1). The planned creation of a body of water can have a positive effect (+1).
- *Significance of individual influences:* The impact of habitat occupation can be evaluated as -1, taking into account the fact that green frogs do not reproduce in the area. As part of the reclamation, a wetland area will be created in the area, which frogs will also be able to use

for reproduction. The impact of the project on the jumpers can be evaluated positively in the long term (+1).

- *Proposed mitigation measures:* Before the start of overburden, carry out transfers of the individuals present to biotope-like areas in the vicinity.

Agile Frog

- *Occurrence in the area of the project and its surroundings:* The occurrence of frogs was recorded in parts of the territory adjacent to the Elbe River and in the forest in the northern part of the area. Reproduction in the area of interest has not been confirmed, but it can be assumed in the vicinity of the project.
- *Identification of influences: Frogs* will be affected by the loss of habitat used for hunting for food (-1). The planned creation of a body of water can have a positive effect (+1).
- *Significance of individual influences:* The impact of habitat occupation can be evaluated as -1 only taking into account the fact that slender frogs are unlikely to reproduce in the area. As part of the reclamation, a larger dry polder will be created in the central part of the territory after mining, with a permanent occurrence of wetlands and pools, which frogs will also be able to use for reproduction. The impact of the project on the jumpers can be evaluated positively in the long term (+1).
- *Proposed mitigation measures:* Before the start of overburden, carry out transfers of the individuals present to biotope-like areas in the vicinity.

Common Toad

- *Occurrence in and around the area of the project:* The scattered occurrence of toads was confirmed in almost the entire area of the project. Occurrence from a wider area is known.
- *Identification of influences:* Toads will be affected by the loss of habitat used for hunting for food (-1). The planned creation of a body of water can have a positive effect (+1).
- *Significance of individual influences:* The impact of habitat occupation can be evaluated as -1 only taking into account the fact that slender frogs are unlikely to reproduce in the area. As part of the reclamation, a larger dry polder will be created in the central part of the territory after mining, with a permanent occurrence of wetlands and pools, which frogs will also be able to use for reproduction. The impact of the project on toads can be evaluated positively in the long term (+1).
- *Proposed mitigation measures:* Before the start of overburden, carry out transfers of the individuals present to biotope-like areas in the vicinity.

European green toad

- *Occurrence in the area of the project and its surroundings:* In 2019, it was found by P. Janda in an industrial area in two large puddles at the site of landfills, which were then created by sinking during the handling (rolling) of material.
- *Identification of influences:* Toads will be affected by the loss of habitat used for hunting for food and reproduction (-2). The planned creation of a body of water can have a positive effect (+1).
- *Significance of individual influences:* The impact of habitat occupation can be evaluated as -2. As part of the reclamation, a larger dry polder will be created in the central part of the territory after mining, with a permanent occurrence of wetlands and pools, which frogs will also be able to use for reproduction (green toads can move a distance of several kilometers during the year). The impact of the project on the toad population can be assessed as zero (0) in the long term.

- *Proposed mitigation measures:* Initial fieldwork to be carried out outside the breeding season and the presence of toads in the water (i.e. from the beginning of April to the end of August). No new wetland areas should be created during this work, as there is a risk that they will be rapidly colonized by toads and used for reproduction. In the opposite (less desirable) case, it will be necessary to transfer the toads to a suitable alternative area in the vicinity (e.g. the littoral of the blind arm of the Elbe).

Sand lizard

- *Occurrence in the area of the project and its surroundings:* Lizards are relatively abundant in the area of interest, their occurrence has been recorded in almost the entire area of the project, especially at the edges of roads, forests, etc.
- *Identification of influences:* They will be affected by the loss of habitat that they use for hunting and reproduction. At the same time, new habitats will be created.
- *Significance of individual impacts:* At the time of the commencement of the works, the negative impacts of mining can be assessed as -1, as as a result of the gradual occupation and continuous reclamation, only a small part of the territory will occupy a suitable biotope. After that, suitable habitats will be re-established and a return to the status quo can be expected from the point of view of the local population. The effect after the end of the activity can be evaluated as zero (0) compared to the current situation.
- *Proposed mitigation measures:* Before the start of overburden, carry out transfers of the individuals present to biotope-like areas in the vicinity.

Slow worm

- *Occurrence in the area of the project and its surroundings:* It was observed on the forest edge in the northern part of the area, it can be expected in other parts of the area of interest. Slowworms can also be found in the vicinity of the project.
- *Identification of impacts:* The area in which the slowworm was recorded is located in the area of the planned mining. They will therefore be affected by the occupation of habitat used for reproduction and hunting. At the same time, new habitats will be created.
- *Significance of individual impacts:* At the time of the opening of the quarry, the negative impacts of mining can be evaluated as -1, because as a result of the gradual occupation and continuous reclamation, only a small part of the territory will occupy a suitable biotope. During and after mining, the re-emergence of suitable biotopes can be expected. The post-activity effect can be assessed as slightly negative (-1) compared to the current situation.
- *Proposed mitigation measures:* Before the start of overburden, carry out transfers of the individuals present to biotope-like areas in the vicinity.

Grass snake

- *Occurrence in the area of the project and its surroundings:* It was recorded in the northern part of the area. Its occurrence is also probable from the vicinity of the project.
- *Identification of influences:* The grass snake will be affected by the occupation of the habitat it uses for hunting, reproduction and shelter. At the same time, new suitable biotopes will be created, and the creation of a water area is planned as part of the reclamation.
- *Significance of individual influences:* Habitat occupation is the most important impact, it can be evaluated with the grade of -2, as its occurrence is known from the area of only the first two stages of the project. As part of the reclamation, a pond will be created in the area, which the grass snakes will also be able to use for reproduction. The impact of the intention on grass snakes can be assessed neutrally in the long term (0).

- *Proposed mitigation measures:* Before the start of overburden, carry out transfers of the individuals present to biotope-like areas in the vicinity.

Barn swallow
- *Occurrence in the area of the project and its surroundings:* Only overflights were recorded over the area. Swallows can use the area to hunt for food, which they find above wetlands and loose areas without trees. It does not find suitable conditions for nesting here.
- *Identification of influences: Swallows* can be affected by a change in food availability.
- *Significance of individual influences:* Preparatory and mining work will not affect the occurrence of swallows (0)
- *Proposed mitigation measures:* None

Grey partridge
- *Occurrence in and around the area of the project:* Partridges reproduce in areas covered with cane. The occurrence of partridges is not known from the vicinity.
- *Identification of influences:* Partridges will be affected by the temporary loss of nesting habitat and food availability. As part of the reclamation, new areas suitable for the occurrence of partridges may be created.
- *Significance of individual impacts:* Due to the loss of only a part of the nesting habitat (gradual occupation + continuous reclamation), the project will have a slightly negative impact (-1) at the time of implementation. In the case of properly carried out reclamation, the long-term impact of the project can be considered zero (0).
- *Proposed mitigation measures:* Overburden should be carried out outside the breeding and rearing periods. In parts of the territory where a high number of visitors is not expected, the ruderalis character of the habitat should be retained, or the presence of shrubs and extensive management (small-scale mowing carried out at the end of summer) should be ensured.

Common quail
- *Occurrence in the area of the project and its surroundings:* Quails reproduce in areas overgrown with cane. Their occurrence is not confirmed from the vicinity.
- *Identification of influences:* Quails will be affected by the temporary loss of nesting habitat and food availability. As part of the reclamation, new areas suitable for the occurrence of quails may be created.
- *Significance of individual impacts:* Due to the loss of only a part of the nesting habitat (gradual occupation + continuous reclamation), the project will have a slightly negative impact (-1) at the time of implementation. In the case of properly carried out reclamation, the long-term impact of the project can be considered zero (0).
- *Proposed mitigation measures:* Overburden should be carried out outside the breeding and rearing periods. In parts of the territory where a high number of visitors is not expected, the ruderalis character of the habitat should be retained, or the presence of shrubs and extensive management (small-scale mowing carried out at the end of summer) should be ensured.

Common raven
- *Occurrence in the area of the project and its surroundings:* Overflights over the area were recorded, nesting was not confirmed.
- *Identification of influences:* There are no very suitable nesting habitats in the area.

- *Significance of individual influences:* The intention will have almost no effect on the raven.
- *Proposed mitigation measures:* None

Red-backed shrike

- *Occurrence in the area of the project and its surroundings:* Nesting of at least five pairs has been recorded in the area. The occurrence of shrikes is also known from a wider area.
- *Identification of influences:* Shrikes will be affected by the loss of nesting and food habitat. As part of the reclamation, new habitats suitable for shrikes will be created on an ongoing basis.
- *Significance of individual impacts:* Due to the loss of only a part of the nesting habitat, the project will have a slightly negative impact (-1), as the phasing of the plan will involve continuous reclamation and planting of shrubs.
- *Proposed mitigation measures:* Planting substitute solitary thorny shrubs (hawthorn, rosehip, blackthorn) that can be used by the shrike for nesting and shelter. This measure can reduce the negative impact (-1).

Whinchat

- *Occurrence in the area of the project and its surroundings:* Nesting of two pairs was recorded in the area (southern half of the northern part of the area). Occurrence from the surrounding area is unknown.
- *Identification of influences:* Potato beetles will be affected by the loss of nesting habitat and food availability.
- *Importance of individual influences:* Due to the loss of the ideal nesting habitat, the project will have a negative impact (-2). In the future, the creation of new nesting habitats can be expected in connection with mining. At this time, the intent will have zero effect (0).
- *Proposed mitigation measures:* Leave areas with unmowed vegetation on unused edges of the territory.

Corn bunting

- *Occurrence in the area of the project and its surroundings:* In the central-southern part of the area, nesting of one pair was recorded. Occurrence from the vicinity is unknown.
- *Identification of influences:* Buntings will be affected by the change/loss of nesting habitat as well as food availability. As part of the reclamation, new habitats suitable for buntings will be created on an ongoing basis.
- *Significance of individual impacts:* Due to the loss of the ideal nesting habitat, the project will have a negative impact (-2), in the case of successfully implemented mitigation measures, the negative impact of the project could be reduced (-1).
- *Proposed mitigation measures:* Plant substitute shrubs (hawthorn, rosehip, blackthorn) in advance (before the liquidation of the existing biotope) in areas of similar character to ensure the continuous presence of a suitable biotope.

Common nightingale

- *Occurrence in the area of the project and its surroundings:* Nesting of two pairs was recorded in the southern and northern parts of the area. Nesting at other sites in the faunistic square has also been proven.
- *Identification of influences:* Nightingales will be affected by the loss of nesting and food habitat. As part of the reclamation, new biotopes suitable for the occurrence of nightingales will be created on an ongoing basis.

- *Importance of individual impacts:* Due to the loss of only a part of the nesting habitat at a time, the project will have a slightly negative impact (-1), as the phasing of the plan will involve continuous reclamation and planting of trees.
- *Proposed mitigation measures:* Felling should be carried out outside the breeding and rearing periods.

Eurasian golden oriole

- *Occurrence in the area of the project and its surroundings:* Nesting of one pair was recorded in the central part of the area. Nesting in the vicinity of the project is unknown. With regard to the fact that an access road will be built in the central part, the area of the current nest will be affected from the very beginning of the implementation of the plan.
- *Identification of influences:* Orioles will be affected by the loss of nesting and foraging habitat.
- *Importance of individual influences:* Due to the loss of the ideal nesting habitat, the project will have a negative impact (-2).
- *Proposed mitigation measures:* Felling should be carried out outside the breeding and rearing periods.

Red squirrel

- *Occurrence in the area of the project and its surroundings:* The occurrence of the squirrel was recorded in the forest in the south-western part of the area. Occurrence in the wider vicinity of the project is likely.
- *Identification of influences:* The red squirrel will be affected by the loss of habitat used for breeding and foraging/hunting for food. As part of the reclamation, new woody areas will be created on an ongoing basis.
- *Importance of individual influences:* The loss of an important habitat will have a negative impact at the time of occupation (-2). From a long-term point of view, the impact can be considered only slightly negative to zero, as new tree stands will be planted in the area. Squirrels are likely to use the reclaimed area only after the trees have grown, not immediately after they are planted.
- *Proposed mitigation measures:* Felling should be carried out outside the breeding and rearing periods.

Bats (*Microchiroptera*)

- *Occurrence in the area of the project and its surroundings:* Only flights over the area were recorded for both species, the occurrence of summer colonies was not recorded and is unlikely due to the characteristics of the species.
- *Identification of influences:* The evening bat will be almost unaffected.
- *Significance of individual influences:* The intent will have zero impact.
- *Proposed mitigation measures:* None

Smooth newt

- *Occurrence in the area of the project and its surroundings:* The occurrence of newts was recorded in forest wetlands in the western part of the territory.
- *Identification of influences:* Newts can be affected by direct elimination or indirect habitat loss.
- *Significance of individual influences:* There may be a decrease in the local population.
- *Proposed mitigation measures:* At least one year before the liquidation of spawning grounds, create at least the same number of potential spawning grounds in the vicinity of

the project, or verify the suitability of existing ones (e.g. a revitalized pool and a blind arm east of the tailings). Before the start of the work, it is possible to transfer the newts to these new areas.

Other invertebrates (except specially protected)

During the survey of invertebrates, 7 species were recorded, which are listed in the Red List. Two species fall into the category of critically endangered (CR), one species into the category of endangered (EN) and four species fall into the category of vulnerable (VU). The most important find is the goldfinch *Hedychridium krajniki*, which occurs only in very good sand and loess localities. Other sand-loving bioindicator species included in the Red List include *Crossocerus wesmaeli and* Tachysphex obscuripennis, Hedychrum nobile *and* Priocnemis minuta. Other sand-loving species worth mentioning are *Crossocerus exiguus, Nysson trimaculatus* and *Lasioglossum politum*. Very important was the discovery of the rare handyman *Pemphredon austriaca,* which is very rarely collected, perhaps even overlooked due to its hidden way of life. This species probably nests only in the galls of the oak gall.

Of the bees included in the Red List, only *Epeolus variegatus* was recorded at the site. Tailings are particularly important in terms of the occurrence of goldfinches, burrows, and handymen. They are not so important for bees, because there is not as many plants that bees are specialized in, as is the case in natural sandy habitats.

To compensate for the negative impact on insects, it was proposed to leave the enclave without a layer of humus soil, i.e. with a sandy loamy non-humus substrate, on the top of the reclaimed spoil heaps and reclamation.

Summary assessment of the impact on animals

Although the impact of most of the mentioned species is evaluated as negative, it can be stated that the proposed method of mining and reclamation, which means gradual annual occupation and an accelerated return of the territory to a renaturalized state, significantly mitigates or minimizes the negative impacts.

Most animals will have sufficient time to migrate from untouched areas to areas with already completed remediation and reclamation. Migration will also be supported, if necessary, by rescue transfers in accordance with the conditions set by the nature conservation authority as part of the procedure for exemptions from Section 50 of Act No. 114/1992 Coll., on Nature and Landscape Protection. It is also essential to have the right timing of tree felling and overburden work in order to cause as little damage as possible to individuals and their developmental stages.

In summary, it can be stated that the degree of impact on specially protected and rare animal species will also be influenced in the future by the consensus of the parties involved regarding the proposed method of remediation and reclamation. These are landowners, investors, affected municipalities, nature conservation authorities and the general public. The current idea of land use is more of a natural or extensively recreational form. Based on the results of the biological survey, measures to increase the biodiversity of the area were included beyond the scope of the original concept of reclamation, which are listed above for individual species and are summarized in Part B and Chapter D.IV.

Given the size of the area, it is possible to balance the interests of nature conservation and the interests of recreational or similar use of the area. Further discussion on these issues is expected in the next phases of the preparation of the plan, while also taking into account the impacts on specially protected and rare species of plants and animals and biodiversity in general.

In view of the above, the impact on specially protected animal species is evaluated as **unfavourable** for the duration of mining and reclamation**, i.e. long-term, but very well compensated by protective measures.** The influence is **reversible**. After the completion of remediation and reclamation, the impact is evaluated as **insignificant and potentially even favourable** if it outweighs the natural use of the area as it is now proposed.

Destruction and damage to trees and woody plants growing outside the forest

The intention will affect trees growing outside the forest. A significant part of the area is overgrown with trees. According to the Land Registry, the land is not listed as a forest, so the impact is evaluated as an impact on trees growing outside the forest.

<u>Mining area</u>

Most of the stands of non-forest tree species were evaluated in 2017 on the basis of the original AOPK methodology from 2013. This is the area of the proposed DP Trnávka. For the purposes of evaluating the stands (according to the updated methodology from 2022), data from this original survey were used. In addition, in 2022, field work was carried out on areas outside the proposed DP, which are adjacent to this DP from the west and south sides, and which will be used for the construction of a temporary landfill and for other handling areas. Details are also provided in Section C.

The total area of vegetation in the area of mining is 65.3 ha, of which 56.6 ha is in the proposed DP Trnávka (fieldwork 2017) and 8.7 ha in the area outside this DP.

There is a relatively narrow species composition of woody plants in the DP itself. Most of the trees are younger, with a trunk circumference of less than 80 cm at a height of 1.3 m above the ground (about 99% of trees). These are mainly silver birch and aspen poplar. The number of individuals with a trunk circumference of more than 80 cm above the ground at a height of 1.3 m above the ground is about 1,182 individuals, these are mainly Norway maple, Scots pine, silver birch, poplars and oaks.

Even in the part outside the DP, the species composition is not very varied, the representation of woody plants is dominated by silver birch together with aspen and ash. The whole area is made up mainly of mature trees of various ages, but even here individuals with a trunk circumference of 1.3 m to 80 cm predominate (89%). A total of 363 individuals of trees with a trunk circumference of more than 80 cm, according to the methodology evaluated, were recorded in the area of interest.

<u>Plant area</u>

A survey was carried out on the premises of the processing plant in 2019 according to the AOPK methodology from 2017. The methodology does not contain significant differences compared to the one from 2022, so the survey was left unupdated, it is sufficient for the needs of environmental impact assessment. In the next phases of the project preparation, i.e. especially for the permission to cut down trees, further updating of the surveys is not excluded.

A dendrological survey identified about 200 items in the area of the processing plant, most of which are solitary trees with a trunk circumference of more than 80 cm above the ground at a height of 1.3 m, as well as 13 involved stands with an area of about 13.4 ha, several groups of larger trees in these stands and several double-trunked trees. In total, about 200 trees with a trunk circumference of more than 80 cm and about 13.4 hectares of stands with smaller trees and shrubs will be affected.

Canadian poplar, silver birch, aspen poplar, Scots pine, and English oak predominate in the area of the plant.

The very fact of felling such a large number of trees can be evaluated as a significant adverse effect in terms of size.

However, other factors should also be considered to assess the overall significance of the impact:

1. The clearing of trees in the logging area will be gradual, it will always be carried out one year in advance before logging, so it will be divided into about 25 annual procedures.

2. After the current tailings have been exploited and secured mining waste dumps have been created, the area will be reclaimed, during which a larger number of trees will be planted. The planting of trees is solved by the proposal of a comprehensive plan of remediation and reclamation (Annex No. In the area of interest, two types of reclamation with tree planting are proposed:

- large-scale planting of woody plants,
- shrubs and loose planting of woody plants.

The first represents the planting of woody plants on 80% of the area and on 20% with the establishment of grass-herb communities, in the second the ratio is reversed, where TTP (80%) prevails over the planting of woody plants (20%).

Large-scale planting of trees is proposed on an area of 35.71 hectares, shrubs and loose planting on an area of 22.61 hectares. A total of 265,000 trees and 66,000 shrubs will be planted in these areas, i.e. a total of about 331,000 trees. Of course, there will be continuous care of these trees and planting for dead individuals. As a result, the stand of woody plants will be composed of individuals with higher quality and better species composition than at present, when a large part of the stands is made up of young sticks without any maintenance.

The area west of the pipeline leading from the el. Chvaletice will not be directly affected by the plan, the trees will not be cut down, however, the investor plans to use these plots to connect the proposed reclamation concept in the area of the project with the surroundings. Pruning will be carried out in the existing vegetation to create a forest park naturally connected to the open space on the banks of the Elbe River.

With regard to the nature of the spoil heaps, where the trees will be planted on soil in a thickness of 1.5 – 2.0 m and insulated subsoil, dependent only on precipitation fallen in the area of interest, mainly drought-tolerant species were selected, at the same time the selection of species is based on the species composition of natural communities growing in places with similar natural conditions and the potential natural vegetation of the area. It is then advisable to put more reinforcing trees on the slopes, such as European nuthatch or common dogwood.

The following tree species were chosen for renaturalization: sessile oak, silver birch, Norway maple, field maple, aspen poplar, black poplar, grey alder, rowan, one-seeded hawthorn, European nutmeg, dogwood, viburnum tušalaj. In the area of shrubs and loose plantings, the one-seeded hawthorn can also be supplemented with other thorny shrubs such as blackthorn or rosehip, which are recommended as a measure for red-backed shrike and meadow bunting.

Solitaire trees will also be planted within the processing plant. At the same time, existing stands of woody plants will be left at the edges of the plant on the notifier's land. These are mainly the western and southwestern edges of the area. In Picture 4, these stands are within the area designated as the "project area", but outside the area of the processing plant itself. This vegetation will be cared for (pruning, planting) to create the most effective barrier for the spread of noise or air pollution.

The notifier expects to carry out substitute plantings before the start of the implementation of the project and during the first years of mining also in areas other than the mining area itself and its surroundings. The extent of planting has not yet been specified and will be specified according to the requirements of the affected municipalities. Replacement plantings will be specified during the discussion of applications for permission to cut down trees.

In its significance, the impact is evaluated in the construction and operation phase **as unfavourable and long-term, but reversible and well compensated**, in the period after remediation and reclamation as **insignificant** with regard to the proposed extent of tree planting and the improvement of abiotic conditions on the site (compensation of the impact will be applied).

Liquidation, damage to forests

The project will not affect forest stands. The assessment relates to the stands on the PUPFL plots. The assessment of the impact on trees growing outside the forest is given above.

The impact on forest stands is assessed as **zero**.

Liquidation, intervention in ÚSES and VKP elements

There is no registered significant landscape element in the area of interest or in its surroundings.

The nearest significant landscape elements, so-called "by law", are forest-like vegetation (although they are outside forest land), which are located directly on the deposit area and in the vicinity of the project. In the event that the nature conservation authority evaluates these stands as forests, the notifier will have to obtain a binding opinion – consent to the intervention in an important landscape element pursuant to Section 4 (1) of the Act. 2) Act No. 114/1992 Coll.

The VKP also includes the nearby Elbe River, which lies at a distance of about 50 m at the eastern, northern and western borders of the area of interest, including the floodplain. It can therefore be stated that the intention lies in the VKP (Elbe floodplain). Further afield, behind the eastern border, there is an unnamed watercourse. However, it is mostly anhydrous, the character of the bottom of the stream indicates that the drying up of the stream is frequent and repeated, and in most places the stream has been without water for a long time. As a result, the fauna of aquatic organisms is completely destroyed. Classification among the VKP is therefore debatable and in this case it will probably be necessary to assess the nature protection authority again. However, together with the accompanying woody vegetation, this element certainly strengthens the ecological stability of the landscape, and therefore the element of the local ÚSES (local bio-corridor) is defined here.

The local biocentre of ÚSES is further demarcated just beyond the northern border of the DP towards the Elbe River, which is then crossed by the axis of the supra-regional bio-corridor.

Memorial trees do not occur in the area of the project or in the wider area.

In general, it can be stated that there is a collision of two difficult-to-reconcile phenomena in the land-use planning documentation. It is not possible for the delimitation of an element of ÚSES in the area of the registered exclusive deposit to prevent its subsequent use, such an understanding would be in conflict with the provisions of the Act. § 15 of Act No. 44/988 Coll.

(Mining Law): "In order to ensure the protection of mineral resources in a timely manner, spatial planning authorities and processors of spatial planning documentation are obliged to base their land-use planning activities on documents on identified and presumed exclusive deposits provided to them by the Ministry of the Environment of the Czech Republic; In doing so, they shall proceed in accordance with special regulations and shall be obliged to propose a solution that is most advantageous from the point of view of the protection and use of mineral resources and other general interests protected by law."

There is also an agreement between the Ministry of Industry and Trade, the Ministry of the Environment and the CBU from 2009, which is published as point 8 in the document "METHODOLOGICAL AID for clarification of competencies in the issue of territorial systems of ecological stability" (Bulletin of the Ministry of the Environment 08/2012): "The structural parts of the ÚSES must be determined as a priority outside the areas of identified and expected mineral deposits due to their non-relocatable. Where it will not be exceptionally possible, respect the designated mining areas (DP) when defining parts of the ÚSES on deposits, and outside the ÚSES then e.g. by temporarily determining a part of the ÚSES and its final creation after the end of mining, by setting the conditions for reclamation. The coverage of defined bio-centres and bio-corridors into mineral deposits is not mutually exclusive, because the structural parts of the ÚSES are not an obstacle to the exploitation of mineral deposits in such a way that ensures the mutual coexistence of the mining of mineral deposits and the function of the ÚSES in ongoing mining or ensures the future restoration of the temporarily limited function of the ÚSES. Conflicts between mineral resource deposits and the existing ÚSES shall be resolved within the framework of taking into account the mutual needs of land use and regularities, both for ÚSES and for mining, in the qualified processing of the procedure for land reclamation after the end of mining within the framework of a mining permit or mining plan. Areas after mining of mineral resources in the area designated for the construction of ÚSES should be reclaimed as a priority in accordance with the interests of nature and landscape protection. Therefore, the delimitation of the constituent parts of the ÚSES in the area of the deposits is not an obstacle to the possible use of the deposit, provided that if the functions of the ÚSES are temporarily limited by the use of the mineral deposit, they will be restored to the necessary extent after the end of mining. When resolving conflicts (overlaps) of the protection of mineral resources with the structural parts of the ÚSES, i.e. with the general protection of nature and landscape, take into account the following condition: Accept the character of the parts of the ÚSES and support its functions in the target state, both during the mining itself and during the termination of mining and the reclamation of the affected area in favour of the ÚSES."

In this case, mining activities will be carried out on the area of the sludge ponds themselves (which are not elements of VKP or ÚSES) and any impacts outside these areas will be insignificant. The ecological functions of any surrounding elements of ÚSES or VKP will not be disturbed. From this point of view, the effect is evaluated as insignificant. The following facts were also taken into account in the evaluation:

1. The proposed method of mining and reclamation means gradual annual occupation and an accelerated return of the territory to a renaturalized state, the potential negative impacts are thus significantly mitigated or minimized.

2. As part of the implementation of the project, the historical environmental burden of the area will be removed - the unsecured repository of waste from the treatment of mineral resources. The site is a source of groundwater contamination and therefore a risk of endangering all the above-mentioned elements of VKP and ÚSES.

The impact is assessed as **insignificant.**

Impacts on Sites of Community Importance and Bird Areas

A statement of the nature conservation authority was issued on the project pursuant to § 45i par. 1 of Act No. 114/1992 Coll., on Nature and Landscape Protection, as amended, namely the opinion of the Regional Authority of the Pardubice Region, Department of the Environment and Agriculture of 24 March 2020 under Ref. No. 21444/2020/OŽPZ/Pe, which states that the Submitted Project, alone or in conjunction with other plans or concepts, cannot have a significant impact on the subjects of protection or the integrity of any Site of Community Importance or any Bird Area.

The nearest (approx. 0.2 km or more) Site of Community Importance is the site of Louky u Přelouče; The subject of protection is the marsh blue and the vaccinated blue and their habitat. The nearest (approx. 11.9 km) bird area in question is Žehuňský Pond - Obora Kněžičky (the subject of protection here are the populations of the Spotted Crake and the Little Bittern and their biotope). Other more distant sites of Community importance and bird areas have similar requirements for protection against undesirable influences; their threat lies in particular in the direct disturbance of the subject-matter of protection; damage to their habitats – places for breeding, wintering or hibernation; destruction or damage to natural habitats, migration corridors etc. In order to issue this opinion, the Regional Authority therefore considers the assessment of the relationship between the negative impacts of the project and the nearest localities (and their objects of protection) to be sufficient.

The impact is assessed as **insignificant**.

Impact on ecosystems, habitats and biodiversity

Within the biological survey, biotopes were differentiated in the area of interest according to the Methodology of Habitat Mapping of the Nature Conservation Agency (see Chapter C.2.5).

In the area of the proposed MGL and in the immediate vicinity there are mostly non-natural biotopes: X2 Intensively managed fields, X3 Extensively managed fields, X5 intensively managed meadows, X7A ruderal herbaceous vegetation outside settlements, conservation important stands, X7B ruderal herbaceous vegetation outside settlements, other stands, X9B Forest plantations with non-native deciduous trees, X12B self-seeding of pioneer trees, other stands, X13 non-forest tree plantations outside settlements, X14 watercourses and reservoirs without vegetation of conservation importance.

From the natural biotopes, the K3 biotope of tall mesophilic and xerophilous shrubs can be defined in the area, locally (rather on the roads) the vegetation of shallow drier soils is indistinctly developed, which tends to the T5.5 biotope.

However, it can be stated that in general, the entire territory of the proposed DP, including non-natural biotopes, has its ecological value due to its character and abandonment in the industrial and agricultural landscape of the central Elbe region, mainly in terms of the occurrence of a number of animal species, including specially protected ones. The effect on these species is evaluated above.

All biotopes will be gradually taken over for mining during the 25year duration of the project. After mining, remediation and reclamation of the area will be carried out on secured spoil heaps of waste from manganese ore processing. Biological reclamation will aim at the biological revival of the remediated areas so that they can be handed over for subsequent use by local residents. The vision of land use is a combination of natural and recreational functions, which will be further specified in the next phases of the project. The plan currently being submitted is about setting up the basic form of the area of interest, which aims to create a natural area

8 types of areas were set aside according to the method of remediation and reclamation (for details, see Part B and separate Annex SPSR No. 8):

- spoil heaps – continuous tree plantings/group tree plantings,
- spoil heaps – establishment of grass-herb communities,
- dry polder,
- water bodies,
- roads and paved areas,
- spoil heaps – successional areas without humus substrate,
- areas outside spoil heaps – areas under existing tailings,
- Areas outside the deposit – areas of temporary deposits of overburden materials.

The submitted proposal is consistent with the effort to create a biologically diverse area with the potential for the gradual creation of natural habitats. This will guarantee a higher ruggedness of the area with more natural landforms and the creation of a micro-basin with a central water surface and wetland communities. The proposed addition of areas for the development of xerothermic habitats and, in general, conditions for the development of natural and controlled succession will also be important.

The basic document defining priorities in the field of protection and sustainable use of biodiversity in the Czech Republic is the Strategy for Biodiversity Protection of the Czech Republic for the period 2016–2025 (Ministry of the Environment, 2016). Although the strategic level of the document is not very consistent with the specific impacts and measures of the intent, it can be stated that the intent does not contradict the relevant objectives, e.g.:

- 2.4.2 Maintain or increase the size of natural habitats
- 2.5.2 Improve landscape structure
- 2.5.3 Improving landscape permeability for biota
- 3.3.2. Reduce pollution and improve physicochemical water quality
- 3.3.6 Increase landscape retention capacity
- 3.5.3 Increase the share of land reclamation after mining by spontaneous succession

The implementation of the plan represents the destruction of current habitats, which can be evaluated positively in terms of biodiversity. The occupation for mining activities will be gradual and temporary, and after remediation and reclamation, biotopes will be created that are at least as valuable in terms of biodiversity as they are at present.

In view of the above, the impact on ecosystems, biotopes and biodiversity is generally assessed as **unfavourable** for the duration of mining and reclamation**, i.e. long-term, but very well compensated by protective measures.** The influence is **reversible**. After the completion of remediation and reclamation, the impact is evaluated as **insignificant and potentially even favourable.**

8. *Impacts on the landscape and its ecological functions*

Impact on landscape character

A study assessing the impact of land use change on the landscape character was prepared for the assessed project (Klouda, 2022).

Within the framework of the study, the effects on the features and values of individual characteristics of the landscape character are evaluated in detail (see Chapter IV). C.1.1) separately for:

- the natural characteristics of the area,
- cultural and historical characteristics of the area,
- visual characteristics of the area

The assessment is based on the standard methodological approach of the team of authors led by Assoc. Prof. Vorel – Assessment of the Impact of a Proposed Building, Activity or Change of Land Use on the Landscape Character, based on valid legislation, especially Act No. 114/1992 Coll. on Nature and Landscape Protection. This methodology introduces procedures that use methods used in architectural and landscape composition, using standardized evaluation steps and objectified, generally accepted judgments. The method of assessing the impact of the proposed project on the landscape character is based on the principle of protection of such characteristics, features and values of the landscape character that are significant attributes of the natural and aesthetic quality of the landscape and on the elimination of influences reducing this quality.

In order to assess the impact of the change of land use on the landscape character, the affected landscape area was defined in the area, where the immediate physical impacts of the project in the given locality are manifested (see Chapter IV). C.1.1).

The assessment shows that the implementation of the project – the over-mining of the Chvaletice-Trnávka tailings after the previous ore mining will not cause an unacceptable impact on the natural characteristics of the area and the projected construction of a processing plant for the processing of (over-mined) manganese ore will not cause an inadmissible impact on the natural characteristics of the area. The proposed project will not cause any impact on the subjects of landscape character protection resulting from the applicable legislation (Act No. 114/1992 Coll.) – specially protected areas, important landscape elements, or nature parks.

The planned mining is situated in the area of anthropically created relief formed by deposited waste from former mining and overgrown with self-seeding greenery. Neither the artificially created relief nor the spontaneously expanded (often ruderal) vegetation on its surface represent particularly valuable features or values of the natural characteristics of the area. The currently mined area will be spatially limited (staged) within the entire area of the tailings, and at the same time the excavated area will be continuously refilled in a volume and area close to the original one.

The projected processing plant – production area is also located in an area heavily burdened by anthropology without the occurrence of any valuable natural features. The necessary landscaping and felling of non-forest greenery of low landscape value will not cause unacceptable impacts, and even in the context of a similarly affected surroundings (sludge pond of power plant fly ash), they will not mean a significant change in the natural characteristics of the area.

The influence on the cultural and historical characteristics of the area will also not reach a fundamentally unfavourable size that would make it impossible to implement the plan. The area of interest of the planned mining (proposed by DP Trnávka) represents a remnant of former mining – an activity that has been present in the area for a long time and thus forms a clear feature of its cultural and historical characteristics. The contemplated mining on tailings does not enter the area with any activity that would be in conflict with the historical development of the area. Mining in the area of the tailings in question will not cause the loss of production functions of the area, the deposit currently does not fulfil such a function. The concept of the final form of the mining-affected area aimed at strengthening natural functions in combination with the offer of (less intensive) leisure activities represent a more favourable situation compared to the present, when this specifically formed area segment of the landscape does not meaningfully fulfil its potential.

The projected industrial development is situated in an area with intensive industrial (energy, mining) and transport use. The area of interest of the planned construction of the processing plant is currently largely represented by a set of operational buildings that are reaching the end of their useful life. In this respect, the proposed industrial use – restoration or conversion – represents a positive change without negative side effects (externalities) in the form of restrictions on the existing functions of the area. The proposed plan will not affect the cultural and historical landmarks in the area.

The strongest impacts of the evaluated project are associated with influencing the visual characteristics of the landscape character. In the area of the intended mining, adverse effects are mainly associated with the phase of its implementation. During the implementation of the plan, the projected mining will cause a change in the existing terrain configuration – a modification of a large artificially created elevation. This change, or its manifestation, will be spatially limited and time-differentiated depending on the mining process. The most significant effect of the ongoing mining will be achieved in the first stages (years) of mining, when the northern tailings pond (No. 3) will be mined with the mining front advancing to the west, and also in the final phase, when the (south)eastern tailings pond (No. 2) will be mined with the mining front advancing to the south. The removal of the vegetation component on the surface and the uncovering of the mined raw material will be applied to the area of the Elbe floodplain – especially on the left bank of the river in the vicinity of Trnávka and Řečany, on the opposite bank of the Elbe only to a limited extent. The excavated area will be continuously filled with residual material after the raw material has been used in the processing plant. The manifestation of the mined area will be local, in the flat terrain of the Elbe floodplain, limited by abundant non-forest greenery near the tailings and by numerous water features. From the exposed vantage point on the marginal slopes of the Iron Mountains to the west and south of the Hornická čtvrť (Chvaletická vyhlídka, spoil heaps in the vicinity of the power plant), ongoing mining will be visible permanently, but also differentiated – depending on the progress of the mining front, most strongly during the mining of tailings pond No. 1 (with the progress of mining to the east). The use of mined material in the views from the south will be partially limited by the construction of a processing plant. In the views from the above-mentioned locations, the currently mined area will form a contrasting element or enclave, but without any impact on the spatial arrangement of the landscape – the tailings from elevated viewing places do not form a significant spatial structure, or rather, thanks to the large flat surface and abundant greenery, they are visually fully incorporated into the horizontal landscape of the Elbe region. An important circumstance of the proposed mining is the presence of the dominant buildings of the Chvaletice Power Plant complex, which dominate the spatial formation in the views from the Chvaletice viewpoint and the positions of the Elbe floodplain. The manifestation of these structures will remain dominant even during the mining of tailings.

After the end of mining and the implementation of measures in the form of remediation (refilling) and biological reclamation, positive impacts can be expected in the mined area. The final area and shape of the consolidated spoil heap (its external visual manifestation) will be close to the state before mining. Beneficial effects can then be expected from the concept of reclamation leading to the creation of a specific landscape segment with areas of meadows, shape – and species-differentiated non-forest greenery or wetland habitats in the created local depression inside the restored spoil heap. The final form of the area, co-formed by the above-mentioned diverse landscape elements, provides the prerequisites for effective integration of the affected area into the surrounding landscape by secondary mining.

The proposed construction of a processing plant – an extensive set of large-scale purpose-built (industrial) buildings (ground plan, height, total mass) represents a fundamentally significant change in the area, or rather the image of the local landscape. The site of the planned construction of the processing plant is situated in the lower parts of the marginal slopes of the Iron Mountains, or their transition to the Elbe plain. This area is characterized by a specifically formed landscape picture, which is significantly contributed to by the industrial development, among which the area of the Chvaletice power plant stands out. The proposed processing plant is situated in the immediate vicinity of the power plant site and for the most part occupies areas with purpose-built buildings that are reaching the end of their life.

The projected construction of the processing plant will enhance the industrial character (perception) of the area. However, even with regard to the absolutely decisive position of the power plant dominants (100metre-high 4-metre-high cooling towers, a 300-metre-high chimney, etc.), the visual effect produced does not reach an unbearable level. The strongest manifestation of the proposed industrial development will be achieved from the higher deforested parts on the slopes – Chvaletice Lookout. Even from these vantage points, the processing plant will be in an immediate visual link with the power plant site. On the other hand, a favourable circumstance is the very low potential for influencing the manifestation of the traditional valuable dominant feature of the Evangelical Church in the Hornická čtvrť, which plays a weak role in the views from the open countryside (most strongly in the open area around the power plant – the sludge ponds of the power plant's fly ash).

A larger area of the potentially visually affected area is located in the flat, mostly open terrain of the Elbe floodplain. In the views from these locations, the dominant features of the Chvaletice power plant will also be a determining element of the spatial arrangement of the area. This also applies to long-distance views from Uhlířská Lhota or Rasoch (from the northwest). The visual effect of the proposed processing plant from these locations will be limited by manganese ore tailings (continuously mined and at the same time rehabilitated into morphology – a shape close to the present) and abundant non-forest greenery dividing areas of agricultural land. These elements (shape-diverse non-forest greenery) will limit the real visual impact on the area in the left-hand part of the Elbe floodplain – they will prevent a potentially negative impact on the unique composed landscape of the Kladruby stud farm on the opposite bank.

The overall size of the landscape character project is based on the magnitude of the impacts on the individual identified features of the landscape character in the affected landscape area. The synergistic effect of all influences does not represent an inadmissible interference with the character of the territory or area.

From the point of view of the wording of Act No. 114/1992 Coll., as amended, and its Section 12, in which paragraph 1 lists the subject of landscape character protection in the following categories, the level of impacts can be summarized as follows:

Table No. 109: Assessment of impacts on landscape character

Effect on:	**Phase of project implementation**	**Phase after the end of the project**
Significant landscape elements	*Moderate Influence*	*No effect*
Specially Protected Areas	*No effect*	*No effect*
Cultural landmarks of the landscape	*No effect*	*No effect*
Harmonic Scale	*Moderate Influence*	*Moderate Influence*
Harmonious relationships	*Moderate Influence*	*Weak influence*

The conclusions of the evaluation of the significance of interventions in the individual features (values) of the landscape character of the territory show that the impacts of the proposed plan will not reach such an extent that would preclude its implementation. Changes brought about by the implementation of the project will not impermissibly reduce the current quality of the area in the affected landscape area.

On the basis of the above-mentioned facts, the considered project can be considered as tolerable in terms of impacts on the landscape character and its protection according to Section 12 of Act No. 114/1992 Coll. on Nature and Landscape Protection, the impact is evaluated as **insignificant**.

9. Influences on tangible property and cultural heritage, including architectural and archaeological aspects

Demolition and disruption of buildings and cultural monuments

As a result of the implementation of the plan, no cultural monuments will be destroyed or disturbed.

The project is located directly in the protective zone of the national cultural monument Stud Farm in Kladruby nad Labem. The buffer zone was declared as part of the Zoning Decision on the Buffer Zone (ref. no. MUPČ 16571/2020) and came into force on 9 October 2020. The reason for the delimitation of this buffer zone was to ensure proper protection of the National Cultural Monument in connection with the inscription of the National Cultural and Natural Heritage (UNESCO) as a Landscape for Breeding and Training of Ceremonial and Carriage Horses in Kladruby nad Labem. The aim of the buffer zone is to preserve the landscape and panoramic values of the National Cultural Monument and its visual links with the adjacent areas.

In the buffer zone, emphasis is placed on preserving visual and compositional relations to the urban and landscape values of the above-mentioned national cultural monument, in particular:

- preservation of the current silhouette and panorama
- preservation of the basic characteristic views of the National Cultural Monument
- preservation and regulation of the height of the surrounding buildings, which would limit the visual links to the National Cultural Monument
- preservation of appropriate functions of use and rehabilitation of inappropriately used areas

The above-mentioned requirements were respected during the design work on the project.

The only buildings located in the buffer zone will be obscured from the northern views by their own tailings. However, in accordance with the condition set out in the above-mentioned decision, it will be necessary to obtain a binding opinion pursuant to Section 14 (1) of the Act as part of the further preparation of the project. 2 of Act No. 20/1987 Coll., on State Monument Care, as amended. This binding opinion will be requested as part of the zoning procedure for the location of buildings and the procedure for permitting mining activities. This is a legal obligation.

The potential for joint application of the proposed plan and compositional landscaping in the Stud Farm National Cultural Monument near Kladruby nad Labem can be assumed:

a) in views from higher altitudes on the slopes of the Iron Mountains promontory (higher above the projected processing plant) – typically the Chvaletická lookout; in long-distance views to the north to the vast plains of the Elbe Valley, the Stud Farm area is part of a wide landscape scene in which the existing forest and non-forest greenery forms a visually compact component – compositional landscaping is not visually perceivable or recognizable in long-distance views; Potential shading – restriction of the view to the north as a result of the construction of the processing plant will not mean a reduction in their effect or manifestation in the landscape image.
b) in the view from the Waterworks Lookout, respectively. Water towers in the area of the stud farm in Kladruby nad Labem. In the view from the top of the tower, there will be limited use of the higher-lying operational buildings of the processing plant; The processing plant is situated in the immediate vicinity of the Chvaletice power plant, whose main objects – cooling towers and chimney – achieve a strong visual expression in the landscape scene. In the view from the Waterworks Lookout, the manifestation of the processing plant will be significantly weakened next to the existing dominant cooling towers and the power plant chimney, the above-mentioned high-rise buildings will continue to form a distinctly dominant architectural (industrial) element of the landscape scene.

The planned mining in the proposed DP Trnávka will not be visible from the Water Lookout.

Further details are also provided in the updated assessment of the impact on landscape character (Annex No. 6).

The entire territory of the proposed MGL belongs to UAN III, i.e. to the area where an archaeological find cannot be excluded in advance in the given locality. Due to the fact that the deposits were formed anthropogenically in historically recent times, there can be no archaeologically valuable artefacts in their bodies. However, it is not known whether there is an archaeological site under the deposits or whether archaeological research has been carried out in this area in the past. Mining will be carried out down to the subsoil, so an archaeological find cannot be ruled out with certainty.

In the case of an archaeological find (even if it is unlikely), it must be done in accordance with the Act on State Monument Care No. 20/1987 Coll., as amended.

Apart from the land itself, there are practically no tangible assets in the area of the proposed DP. A wastewater treatment plant is located in the area of the planned quarry facilities. As part of the implementation of the plan, it will be rehabilitated and at the same time a new wastewater treatment plant will be built, which will also serve as a processing plant.

There are a number of buildings on the premises of the processing plant that will be demolished as part of the construction of the plant (see Chapter B.I.6.). All buildings proposed for demolition are or will be the property of the notifier, as well as the land in question.

The impact on tangible assets and cultural monuments is assessed as **insignificant**.

II. CHARACTERISTICS OF RISKS TO PUBLIC HEALTH, CULTURAL HERITAGE AND THE ENVIRONMENT IN THE EVENT OF POSSIBLE ACCIDENTS, CATASTROPHES AND NON-STANDARD CONDITIONS AND THE EXPECTED SIGNIFICANT EFFECTS RESULTING FROM THEM

Mining area

Surface mining and processing of mineral resources in general is a standard economic activity commonly carried out by many business entities in the Czech Republic. The work is carried out using the usual procedures and mechanisms. With regard to the fact that the activity is carried out in the field in contact with individual components of the environment, the occurrence of accidents cannot be completely ruled out. However, the risk of accidents is minimized by preventive measures.

The actual mining of tailings material in the proposed Trnávka DP does not pose a significant risk of accidents with subsequent impacts on environmental components. From the point of view of the mined material and the associated technological procedures, it is rather a less risky activity. The raw material is fine-grained and unconsolidated, so there will be no need to carry out blasting work, nor to crush or treat the raw material on site. From the point of view of the technological process, it will only be loading and transporting, i.e. an activity similar to ordinary earthworks in the construction industry. The wet raw material will be transported only over a short distance within the DP itself.

Similarly, mining waste will be transported back, either by the same mechanization or by conveyor belts, which is again a completely common and safe technology.

A certain risk is posed by the actual disposal of mining waste back into the mining area. This risk arises mainly from the lack of knowledge of the exact composition of the waste material at this stage of the project. With regard to this fact, the security of dumps is proposed at a high level and in the standards for landfills. It is expected that in the next phases of the design preparation, the data on the waste to be deposited will be refined and the technical details of the security will be resolved. Among other things, the procedure will be in accordance with the Mining Waste Act, where the so-called mining waste disposal site will be operated. The requirements for the construction and operation of this storage site will be based on the requirements of the State Mining Administration. From the point of view of possible impacts on lives, human health and the environment, storage sites are classified in categories I or II. Inclusion is carried out by the District Mining Authority (OBÚ) on the basis of the relevant application and documentation and after a risk assessment. The notifier will be obliged to apply to the OBÚ for this classification in the first place. The criteria for inclusion are detailed in Decree No. 429/2009 Coll. A more detailed risk assessment will therefore be prepared and assessed by the District Mining Authority in the next phase of project preparation. The current design of the storage site is designed in such a way that all risks associated with the construction and operation of the storage site are minimized. It is mainly about determining the safe slopes of the closing slopes of the spoil heaps and sufficient insulation. Insulation will be carried out towards the subsoil as well as towards the surface.

Specific possible emergency situations are as follows:

<u>Operational accidents and machinery failures</u>

The risks associated with breakdowns and accidents are not higher than standard due to the designed buildings, technologies and mechanisms. The usual regulations will be followed.

A set of operational documents (emergency plan, traffic rules, maintenance plans, technological procedures of individual activities, etc.) will be prepared to minimize any risks.

Prevention of accidents will be ensured by the control mechanisms of the mining organization. In accordance with established mining procedures and the environmental management system, regular inspections of the operating equipment will be carried out in each shift, as well as by a manager at a specified interval. Random inspections will be carried out by a safety engineer and managers. Security reviews, internal audits of the environmental management system and a third-party audit of the environmental management system will be carried out at least once a year.

Fire

Due to the proposed buildings, technologies and mechanisms, the risks associated with fire are not higher than standard. The usual regulations will be followed. A set of operational documents will be prepared (see the previous point, as well as fire plans and directives, evacuation plan) that will minimize any risks.

Accident with leakage of harmful substances

Oil spills can occur in the event of a breakdown, accident or fire. Leakage is possible either from machinery (fuel, lubricants) or directly from a diesel tank or lubricant storage (workshop). Theoretically, oil pollution could then penetrate into the soil and rock environment or into groundwater and further migrate to the surroundings in the direction of their flow. The entire area of DP facilities will be on a paved and secured area, so any contamination will be easy to identify and remove. The petrol station has three parts. The first part is the oil and lubricant warehouse. The warehouse is equipped with a device against leakage of hazardous and polluting substances. The second part is a roofed refueling area. Its size allows refueling all kinds of mining mechanisms. The third part is an above-ground double-jacketed fuel tank with an expected volume of 20,000 litres. Its replenishment is expected on a weekly basis. The pumping station and oil and lubricant warehouse will comply with the safety regulations in force in the Czech Republic. The fuel tank protection zone is located 12 m from other buildings.

In order to minimize the possibility of an accident in the area of mining and reclamation, appropriate operating regulations will be prepared. Procedures in the event of an accident must describe the emergency plan in a concise and detailed manner, which must be approved by the relevant water authority.

The notifier is obliged to prepare an emergency plan for the establishment in accordance with the provisions of Part IV of the Decree. ČBÚ No. 26/1989 Coll. and No. 51/1989 Coll., as amended, which stipulates the procedure for reporting an accident and the duties and tasks of individual workers in the quarry when removing it. The management of harmful substances will be determined by a separate annex to the Plan of Measures for Cases of Accidental Leakage of Harmful Substances within the meaning of Sections 39, 40, 41 and 42 of Act No. 254/2001 Coll., on Waters and on Amendments to Certain Acts (Water Act) and according to Decree No. 450/2005 on the Requirements for the Management of Harmful Substances and the Requirements of the Emergency Plan, the Method and Scope of Accident Reporting, their disposal and elimination of their harmful consequences

Appropriate technical emergency equipment (e.g. sorption substances, booms and other tools) for emergency situations must be available in the establishment for immediate use, and employees must be properly and demonstrably familiar with their operation.

To prevent the risk of surface water pollution, a groundwater and surface water monitoring system is designed.

Insulation defect with the possibility of water entering the repository (in the phase after closure) or water ingress from the repository into groundwater.

Given the proposed technology and remediation procedure, this is an unlikely situation. Security is expected to be similar to that of landfills.

A monitoring system is designed. Groundwater in the vicinity of spoil heaps and monitoring of water flowing out of closed spoil heaps using a drainage system is expected. Compared to the current situation, where tailings are completely unsecured and contain harmful substances, the situation will always be more favourable.

The method of security will be further refined with regard to the specification of the composition of mining waste.

Landslide during mining or dumping of mining waste

The project design also included a geotechnical assessment of the slopes. The slope of the mining slopes and the slopes of the spoil heaps are designed with regard to minimizing any landslides. These factors will also be taken into account in the Opening, Preparation and Mining Plan. All activities in the mining area will be supervised by the State Mining Administration. Should such an unlikely situation nevertheless occur, there should be no threat to property or the health of people outside the mining area. The height of the spoil heaps (approx. 25 m) and their location preclude such a situation. Any small-scale landslides can be safely remediated. The emergency plan will address the method of rescuing machinery or people in the event of landslides.

Natural disasters

A flood can be assumed as a conceivable natural disaster in the locality, especially in connection with the flood caused by the overflow of the Elbe River outside the riverbed. Other water does not flow into the site and rainwater drainage is solved by an effective drainage and drainage system for water falling into the mining area and into the area of already completed reclamation.

According to the maps of floodplains, from the flow rate approaching Q20 in the area of interest, there is a significant overflow of the Elbe into the surrounding floodplain and the rising water level reaches to the edges of the tailings. Along the northern edge of tailings pond 3 there is a parallel protective dam against hundred-year floods. Thanks to this dam and the influence of geomorphology, the bodies of the tailings ponds 1 and 3 are protected against flooding during flood flows. During increased flood flows, the water level reaches the eastern edge of the body of the tailings pond 2. In the event of an unfavourable concurrence of the mining of tailings pond 2 and a significant flood event, the flood could theoretically penetrate into the mined area.

However, the risk of such a situation is unlikely and, in addition, there are favourable factors at the site to minimize the possible negative manifestations of such a situation. The bodies of the tailings will be mined gradually in smaller areas and immediately remediated. In the event of flooding, only a small area would be affected. During mining, heavy equipment and sufficient suitable material will be permanently available at the site, so that in the event of a negative development of the flood situation, it will be possible to build temporary protective dams around the perimeter of the mined area relatively quickly, which will prevent the direct penetration of floods into the mined area. The material at the site is not very permeable, so any seepage through the protective dams or the bodies of the tailings themselves will be low and the built drainage system will have sufficient capacity for continuous pumping of seeping water. With regard to the low permeability of the material, the level of the flood and the expected time of occurrence of the flood event, it cannot be assumed that such a significant rise in the groundwater level would form in the aquifer of the Quaternary sediments that would cause increased seepage through the bottom into the mined part of the deposit. According to the maps of flood plains, the tailings are located practically at the very edge of the flood. It is therefore an area outside the main flow of water, the rise and fall of the water level will also be gradual. Around the bodies of the tailings, the flow velocity of surface water will be small, without the potential to erode and wash away the deposited material. In addition, a flood protection dam has been built along the entire northern and part of the western side of the tailings. This dam will be maintained and further extended at the north-eastern border of the DP. Flood protection of the area will thus be strengthened.

The area for the temporary landfill partially extends into the Q100 floodplain. Due to the location on the edge of this area and the shape and overall width of the flood plain at the site of the project, there can be no real influence on the water level or the course of the flood. It is a location completely outside the active zone of the flood plain Dočaná depot will be gradually excavated, while the western (i.e. also upstream) side will be grassed and maintained by mowing. It will thus be protected against wind and possibly water erosion.

Extreme precipitation at the site is also not associated with the possibility of risky situations. Climatic conditions can affect mining as such. The material of the tailings is prone to slushing when significantly moistened. The slushy material already has a high degree of saturation on its own and is not able to absorb more water, so after longer or more intense rainfall episodes, the lower-lying berms may be flooded. Due to the low permeability of the stored material, rainwater will not be absorbed and will have to be gradually drained by the built drainage system.

It is necessary to respect the risk associated with floods and in the next phases of the project design to prepare a flood plan that minimizes the consequences of a possible flood. In addition to clear guidelines for the event of expected flood conditions on the Elbe, the flood plan should also preventively address the optimization of mining and remediation procedures so that a long-term lowered terrain dimension is not left on the edges of the project in contact with the floodplain.

As part of the remediation and reclamation, a dry polder will be built in the area between the spoil heaps, which will be used to capture precipitation and its gradual release. The design of the retention reservoir dam, or the dry polder, was based on the ČSN 75 2410 standard, so such technical measures and solutions were chosen that will ensure the stability of the built structures and the safe drainage of surface water even in the event of extreme precipitation. A detailed description of the technical solution, including the capacity of the dry polder, is given in Chapter B.I.6. of this documentation.

The impact of foreseeable types of accidents is mainly limited to the quarry area itself and its equipment. From the point of view of environmental impacts, the most serious can be considered to be a possible leak or spill of oil substances, a fire in the machinery and the facilities of the mining plant. Oil spills pose a risk mainly due to possible contamination of groundwater and surface water and the soil environment. A fire can endanger people's life or health, endanger equipment, property, forests and air pollution.

Processing plant

The normal operation of the processing plant does not pose any significant risks to the workers or residents of the immediate vicinity. The parameters of the plant will comply with all applicable legal standards for health and environmental protection. An emergency would therefore pose a risk to traffic safety. Although the entire technological process in the new construction of the processing plant will be designed in such a way as to prevent extraordinary events, a technical defect or human error cannot be ruled out in any operation, which may result in an extraordinary event (leakage of hazardous substances, fire or explosion).

The construction and operation of the plant will be carried out in accordance with the best available techniques so as to minimize the risk of potential accidents. Emergency situations that can be foreseen will be described in local emergency plans and on the basis of their description, appropriate measures will be taken to prevent accidents and eliminate their possible consequences. As part of the application for an integrated permit, it is assumed that operating rules and an emergency plan for the plant and individual facilities will be drawn up.

Due to its nature and location, the assessed project does not represent a significant potential source of environmental risks or emergency or other non-standard conditions. However, the following events cannot be ruled out, which must be actively prevented, especially by elaborating, training and subsequent control of compliance with operating guidelines, safety and fire regulations.

The following emergency situations could potentially arise from the operation of individual technological units:

- chemical spills
- fire
- explosion of technological equipment of production,
- power outages.

The most significant risks are chemical leakage, fire and explosion caused by fire.

The leakage of chemical substances and materials will be prevented by appropriate structural and technical measures, e.g. sufficiently large impermeable sump basins or sumps. It is also necessary to carry out regular inspections of operation, compliance with the operating regime and maintenance of sump basins and emergency sumps.

Fire safety of the building will be solved according to the relevant legislation and ČSN. The buildings will be secured with sprinklers. It can be assumed that the state of emergency will be eliminated quickly without any significant impact on the environment beyond the boundaries of the assessed building. Due to the nature of the process, the risk of fire is low.

Measures against explosions consist mainly of compliance with safety regulations when handling flammable substances. Explosion prevention is ensured by compliance with the requirements for workplace fire protection.

III. COMPREHENSIVE CHARACTERISTICS OF THE IMPACTS OF THE PROJECT ACCORDING TO PART D, POINTS I AND II IN TERMS OF THEIR SIZE AND SIGNIFICANCE, INCLUDING THEIR INTERACTIONS, WITH SPECIAL EMPHASIS ON THE POSSIBILITY OF CROSS-BORDER EFFECTS

The following table shows the evaluation of the impacts in terms of their overall significance. The evaluation is divided into a phase during the implementation period of the project and a phase after the completion and implementation of remediation and reclamation.

Table No. 7010: Impact assessment summary

INFLUENCE SPECIFICATIONS	SIGNIFICANCE IMPACT			NOTE
	Construction phase	Phases of operation	Post-reclamation phase	Construction phase
EFFECTS ON THE POPULATION AND PUBLIC HEALTH				
Effects on public health	insignificant	insignificant	insignificant	In the operational phase, acceptance of all noise impact measures is a prerequisite
Social and economic influences	insignificant	favourable	insignificant	favourable in terms of employment, financial benefits for municipalities
Influences associated with the change in transport services	insignificant	insignificant	insignificant	
Impacts on recreational land use	insignificant	insignificant	potentially favourable	
AIR EFFECTS				
Impact on air quality	insignificant	insignificant	zero	subject to a number of measures
Change in microclimate	insignificant	insignificant	insignificant	
Impact on climate	insignificant	insignificant with favorable aspects	insignificant	the use of waste instead of primary sources and the provision of domestic inputs for sustainable energy are favourably evaluated; the felling of trees during the construction and operation phase is compensated by planting during the operation phase
INFLUENCES ON THE NOISE SITUATION AND ANOTHER PHYSICIST. AND A BIOLOGIST. CHARACTERISTICS				
Influence of noise from stationary sources	insignificant	insignificant	zero	noise monitoring and a range of measures proposed
Impact of noise from road and rail transport	insignificant	insignificant	insignificant	
Vibration effects	insignificant	insignificant	zero	

INFLUENCE SPECIFICATIONS	SIGNIFICANCE IMPACT			NOTE
	Construction phase	Phases of operation	Post-reclamation phase	Construction phase
Influences on other physical characteristics	insignificant	insignificant	zero	
Biological influences	insignificant	insignificant	insignificant	
Light pollution	insignificant	insignificant	zero	
EFFECTS ON SURFACE WATER AND GROUNDWATER				
Change in groundwater and surface water quality	insignificant	insignificant	potentially favourable	Compliance with accident prevention measures and proper security of dumps in accordance with the requirements of the Mining Waste Management Act is a prerequisite; monitoring is proposed
Changes in resource yield and changes in groundwater level	insignificant	insignificant	insignificant	
Impact on surface runoff and river network change	insignificant	insignificant	insignificant	
SOIL EFFECTS				
Occupation of ZPF	zero	Slightly unfavorable	Slightly unfavorable	not very significant permanent occupation of ZPF in protection class 3
Occupation of PUPFL	zero	Zero	zero	without grabbing
Effects on soil cleanliness	insignificant	insignificant	potentially favourable	compliance with accident prevention measures is a prerequisite; monitoring is proposed
EFFECTS ON NATURAL RESOURCES				
Impact on the rock environment and other natural resources	insignificant	favourable	zero	substitution of primary raw materials by waste
IMPACTS ON BIODIVERSITY (FAUNA, FLORA, ECOSYSTEMS)				
Liquidation, damage to populations or individuals of rare and specially protected plant species	insignificant	insignificant	insignificant	
Liquidation, damage to populations or individuals of rare and specially protected animal species	insignificant	inauspicious	insignificant to potentially favourable	the adverse effect is reversible and compensable; in the post-remediation phase, the effect is assessed as favourable with a certain degree of uncertainty,

INFLUENCE SPECIFICATIONS	SIGNIFICANCE IMPACT			NOTE
	Construction phase	Phases of operation	Post-reclamation phase	Construction phase
				which also depends on the remediation and reclamation carried out
Liquidation, damage to trees and woody plants growing outside the forest	inauspicious	inauspicious	insignificant	Compensable impact due to proposed reclamation; extensive replacement plantings proposed; improved abiotic conditions for tree growth
Liquidation, damage to forests	zero	Zero	zero	
Liquidation, intervention in ÚSES and VKP elements	insignificant	insignificant	insignificant	
Impact on Natura 2000 sites	insignificant	insignificant	insignificant	
Impact on biodiversity, ecosystems and habitats	insignificant	inauspicious	insignificant to potentially favourable	the adverse effect is reversible and compensable; in the post-remediation phase, the effect is assessed as favourable with a certain degree of uncertainty, which also depends on the remediation and reclamation carried out
IMPACTS ON THE LANDSCAPE AND ITS ECOLOGICAL FUNCTIONS				
Impact on landscape character	insignificant	insignificant	insignificant	
EFFECTS ON TANGIBLE ASSETS AND CULTURAL HERITAGE				
Influences on tangible property and cultural heritage, including architectural and archaeological aspects	insignificant	insignificant	insignificant	

No impacts were evaluated in their significance (after assessing the magnitude of the impact, time range, reversibility and other attributes) as **significantly unfavourable** or such as would make it impossible to implement the project.

Adverse impacts are mainly associated with direct land occupation due to its higher biological value. In this way, the impact on specially protected and rare animal species, woody plants growing outside the forest and the impact on biodiversity in general is evaluated. However, these adverse effects are **temporary**, they will only last for the duration of mining.

Due to the proposed method of remediation and reclamation, these effects are **reversible** and **can be compensated** by protective measures. It can be stated that the proposed method of mining and reclamation, which means gradual annual occupations and an accelerated return of the territory to a renaturalized state, significantly mitigates or minimizes the negative impacts. Most animals will have sufficient time to migrate from untouched areas to areas with already completed remediation and reclamation. Migration will also be supported, if necessary, by rescue transfers in accordance with the conditions set by the nature conservation authority as part of the procedure for exemptions from Section 50 of Act No. 114/1992 Coll., on Nature and Landscape Protection. It is also essential to have the right timing of tree felling and overburden work in order to cause as little damage as possible to animal individuals and their developmental stages. Immediate replacement planting of trees will be carried out on the reclaimed areas.

Furthermore, the impact associated with the annexation of the ZPF is assessed as **slightly unfavourable**. In the context of the whole project, however, the impact is acceptable, provided that the authority for the protection of the ZPF agrees. Administratively, the ZPF land with an area of 5.58 hectares will be incorporated into the proposed DP with a total area of approximately more than 119 hectares. However, out of the 5.58 hectares, an area of 2.77 hectares of ZPF with class III protection will be physically affected, where the existing agricultural management will be prevented. The remaining part of the ZPF land cannot be farmed at present or would not be possible in the future, this part lies in the area of the current tailings and there is no BPEJ demarcated there. The impact assessment also takes into account the fact that the entire processing plant with an area of another 27 hectares is located outside the ZPF in the area of a brownfield, which is desirable from the point of view of the protection of the ZPF.

In the original documentation, the noise impacts were evaluated as unfavourable, primarily due to a possible increase in noise in the above-limit polluted area in Trnávka and exceeding the hygienic limit for noise in Hornická čtvrť. The technical solution and conditions for the operation of the project were changed as part of the revised documentation in order to minimize the impact of noise. Therefore, the acoustic study was also fundamentally updated and reworked, while the comments of the KHS on this study were also taken into account. In particular, the updated acoustic study includes the re-evaluated and updated acoustic parameters of the plant's equipment according to the project documentation for the zoning decision (DUR), which specifies the parameters of the plant's equipment (TRACTEBEL ENGINEERING a.s., from 06/2023). The computational model was updated, acoustic modifications of individual devices were proposed, as well as increased sound insulation of buildings in the processing plant and mining area. This took into account the requirement of the KHS of the Pardubice Region, on the basis of which the assessed project must not in any way worsen the unsatisfactory (above-limit) acoustic situation in the municipality of Trnávka, even if the noise from the existing noise sources in the area would reach the hygienic limit LAeq,1h = 40 dB for the nighttime in Trnávka. This proves that after taking into account the noise sources of the assessed project, the value of 40 dB will not increase by even 0.1 dB for the entire duration of the project. On the basis of the amended revised acoustic study, the impact on the acoustic situation, and thus the associated impact on public health, was evaluated as **insignificant**. The intention will not cause exceeding the hygienic limits, nor will it worsen the situation in the case of exceeding or exhausting the hygienic limit due to other sources. Within the framework of noise impacts, numerous measures are formulated to prevent, minimize or compensate for the impact, including the design of continuous acoustic monitoring (see Chapter D.IV.).

Some impacts associated with the natural aspects of the area are evaluated as **potentially favourable to favourable** in the phase after remediation and reclamation. A certain uncertainty in the assessment of this impact is due to the fact that the proposal for remediation and reclamation is still considered preliminary and the final form of the reclaimed area will also be influenced by the consensus of the parties involved. These are landowners, investors, affected municipalities, nature conservation authorities and the general public. Based on current ideas about future use, the aim is to create an area with the highest possible biological value, but at the same time with the possibility of extensive recreational use.

Furthermore, the effects on water quality and the cleanliness of the soil and rock environment are evaluated as **potentially favourable**. The favourable impact is clearly given by the removal of the current source of pollution, i.e. the remnant of the former treatment of mineral resources. A certain uncertainty in the assessment of these impacts in the phase after remediation and reclamation is given by incomplete information on the final composition of the mining waste deposited in the mining area. However, the proposed method of security minimizes this uncertainty to an acceptable level and at the same time it is expected that these effects will be minimized in the process of permitting the mining waste disposal site under the supervision of the State Mining Administration.

The impact on natural resources and the impact on the climate are clearly evaluated **favourably**. This is due to the fact that the intention is to recycle waste after mining, and thus to save the primary natural raw material at another location of potential mining. The energy requirements for extracting such pre-processed material will be lower than in the case of manganese extraction from primary sources. At the same time, manganese plays a significant role in the field of electrical energy storage in batteries. High-purity manganese products in the form of manganese sulfate and metallic electrolytic manganese will be supplied by the notifier to manufacturers of electric vehicles, batteries and active cathode materials primarily in Europe. The European market is the fastest growing market for high-purity manganese. This will contribute to Europe's self-sufficiency in raw materials in a key period of structural changes in the European energy sector. The strategic importance of the project is also evidenced by the support from the European Commission and the acquisition of capital investment from the European Bank for Reconstruction and Development (EBRD) to ensure the preparation of the plan.

Social and economic impacts were evaluated as **favourable,** which is mainly due to financial benefits for the affected municipalities and employment opportunities for local citizens.

Other impacts were evaluated as **zero or insignificant,** including impacts on the population (public health, air quality, seismics and impact on tangible assets). From the point of view of the impact on public health, the above-mentioned measures are proposed due to the complex acoustic situation.

No effects of the project will be **cross-border**. From the point of view of global climate protection, the plan is evaluated positively.

In Part B of the dossier, a comparison was made with the requirements of the best available techniques (BAT) conclusions under Directive 2016/1032 of the European Parliament and of the Council for the following sectors:

- Wastewater and waste gas treatment and management systems in the chemical industry
- Non-ferrous metals industry.

Compliance with BAT requirements has been found.

IV. CHARACTERISTICS AND EXPECTED EFFECT OF THE PROPOSED MEASURES TO PREVENT, ELIMINATE AND REDUCE ALL SIGNIFICANT NEGATIVE IMPACTS ON THE ENVIRONMENT AND PUBLIC HEALTH, AND DESCRIPTION OF COMPENSATION, IF POSSIBLE IN RELATION TO THE PROJECT, AND, WHERE APPLICABLE, MEASURES TO MONITOR POSSIBLE NEGATIVE EFFECTS ON THE ENVIRONMENT (E.G. POST-PROJECT ANALYSIS) RELATED TO THE CONSTRUCTION AND OPERATION PHASE OF THE PROJECT, INCLUDING MEASURES RELATED TO EMERGENCY PREPAREDNESS AND RESPONSE UNDER CHAPTER II

In the following text, the measures are listed according to the phase of implementation of the project in which they will be adopted.

The scope and content of this chapter is adapted from the methodological communication of the Ministry of the Environment OPVIP for authorisation holders dated 6.3.2015, ref. no. 18130/ENV/15. Concretely:

"... it is necessary that the basic measures, which have so far been referred to in Chapter D.IV, or in the conditions of a negative conclusion of the screening procedure, are already part of the plan itself (e.g. in Chapter B.I.6). These measures must therefore be newly understood as measures that are part of the intent and the fulfilment of which is automatically expected, while the competent authority will adopt its conclusions on the basis of the assumption that these measures will be fully complied with during the preparation, implementation, operation or even removal of the intent, without the need to explicitly state them in the form of conditions at the end of the screening procedure (or in the EIA opinion) (e.g. technical implementation of the intent, anti-dust measures, implementation of noise protection measures, application for an integrated permit, etc.). A negative conclusion of the screening procedure will not contain any conditions, so it is necessary that all measures relating to, for example, the factual implementation of the plan, the course and method of carrying out the work, etc., and general conditions have already been incorporated into the plan itself.

In Chapter D.IV (Measures to prevent, eliminate, reduce, or compensate for adverse effects) of the documentation, it is necessary to write only relevant, achievable, specific conditions and to eliminate the conditions arising from the applicable legislation (or not to state such conditions or to incorporate them as part of the plan in another part of the documentation). The declaration of an obligation to comply with legal obligations cannot be regarded as a proposal for measures to prevent, eliminate, reduce or compensate for adverse effects'.

Precautions for the preparation phase

1) Focus on specifying the properties of mining waste before the start of operation. Verify the composition by means of pilot plant tests. According to the specified composition of mining waste, we will also design in detail the method of securing the spoil heaps, specify the details of the technical solution and elaborate the technological procedures for landfill, insulation work and remediation and reclamation procedures. To address this issue in cooperation with the relevant District Mining Authority within the framework of Act No. 157/2009 Coll., on Mining Waste Management, adequately in all phases of preparation: when determining the mining area, when permitting mining activities and when permitting the construction and operation of a mining waste disposal site.

Expected effect of the measure: Elimination of the current uncertainty resulting from the unspecified composition of mining waste. Minimizing the risks associated with potential contamination of water or the soil environment.

2) At the stage of permitting mining activities, to develop a detailed technological guideline that will specify the technological procedures of the mining and disposal of mining waste in order to minimize the risk of carrying the tailings material by water or wind erosion outside the mining area. It should include an effective drainage and drainage system in terms of minimizing water erosion and measures against dust in the event of drying up of an inactive mining wall left for a long time or roads drying out.

   Expected effect of the measure: Prevention of contamination of the surroundings by tailings material. Dust reduction.

3) When designing building envelopes, filling of openings and the method of ventilation of buildings (in proceedings on the location of buildings and building permits), respect the results of the acoustic study and choose such parameters of buildings that have been verified in terms of their acoustic impact. The acoustic requirements for equipment and objects are set out in Chapter B.III.4 of this documentation (Sources of noise from the mining area

Sources of noise in the mining area will be machines and equipment in buildings in the background of the quarry (see **Chyba! Chybný odkaz na záložku.**) as well as mechanization, which will be used in the extraction and handling of raw materials and in remediation and reclamation works. An overview of the individual types of mechanization used in the mining area and the sound power level A (LWA) is given in the following text:

7. *Mechanization for mining operations:*
   2x excavators (CAT374F) – **L_{WA} = 106 dB**
   4x articulated dumper (CAT745) - **L_{WA} = 110 dB**

8. *Mechanization for subsequent remediation works and for the creation of mining waste dumps:*
   2x wheel front loader (CAT972M) - **L_{WA} = 107 dB**
   3x dozer (CATD6N) - **L_{WA} = 107 dB**
   The material will be weighed in by dumpers, which will also take away the excavated material.

9. *Auxiliary mechanization for both processes (mining and remediation):*
   1x grader (CAT160) - **L_{WA} = 106 dB**
   1x vibratory roller (CATCP12) - **L_{WA} = 107 dB**
   Sprinkler truck - **$L_{WA} \leq$ 105 dB**
   other mechanization (forklift in the workshop, truck, service van, fuel tank) - **$L_{WA} \leq$ 100 dB**

According to Government Order No. 272/2011 Coll., on protection against the adverse effects of noise and vibrations, the noise level during the daytime is determined for 8 continuous and consecutive noisiest hours (LAeg, 8h). The concurrence of mechanisms in the mining area during continuous operation for the 8 noisiest hours of the day is as follows:

2 x excavator (CAT374FL) - **L_{WA} = 106 dB/excavator**
1x dozer (CATD6N) - **L_{WA} = 107 dB**
100 articulated dumper cycles (CAT745) - **L_{WA} = 110 dB** (100 excavated material runs + 100 remediation runs)
The operating time of the mechanisms is 7 hours for an eight-hour work Shift.

4) and Table No. 58) and in Tables 5-3-2A and 5-3-3A in the acoustic study.

Expected effect of the measure: Minimization and prevention of effects on the acoustic situation. Reliable compliance with the hygienic limit for traffic noise ($L_{Aeq,1h}$ = 40 dB for nighttime and $L_{Aeq,8h}$ = 50 dB for daytime) in the built-up area of all surrounding municipalities, or no deterioration of the current unsatisfactory state by even 0.1 dB.

5) At the stage of permitting mining activities and zoning proceedings for the location of buildings (or proceedings on permitting the project), an Acoustic Monitoring Plan will be prepared and discussed with the public health protection authority. Acoustic measurements will be carried out after the start of the project operation and further as needed – e.g. When the noise situation changes due to a change in the operation of the surrounding projects and especially when the mining area is brought closer to the development of individual settlements. Noise measurements will be carried out in all potentially affected surrounding municipalities (Chvaletice, Trnávka, Řečany nad Labem, Zdechovice, Selmice, Labské Chrčice).

   Expected effect of the measure: Minimization of effects on the acoustic situation. Monitoring of compliance with the situation in accordance with public health protection legislation

6) After the issuance of the zoning decision for the location of the processing plant (or the decision on the permit of the project), a detailed inventory of tree species will be carried out on the notifier's land on the western and southwestern edge of the plant site. These are stands within the area designated as the "project area", but outside the area of the processing plant itself. A management plan for these stands will be prepared for the period of operation. The aim should be to adjust the spatial delimitation of the stands, their species and age composition and to strengthen the condition of the trees so that the juries form the most effective barrier towards the development of Chvaletice, including the Hornická čtvrť.

   Expected effect of the measure: Minimization of impacts on the acoustic and air pollution situation, light pollution and impacts on the landscape. Compensation of impacts on woody plants growing outside the forest.

7) At the stage of determining the mining area, prepare a Comprehensive Plan of Remediation and Reclamation, which is further specified as a Remediation and Reclamation Plan (part of the Plan for Opening, Preparation and Extraction) when permitting mining activities. At all stages of preparation, these documents should be consulted with nature conservation authorities and measures to minimize the impacts on fauna, flora and biotopes should be incorporated according to technical possibilities.

   As part of the preparation of documents for reclamation, discuss the final form of the area with the affected entities – municipalities, future and current landowners and other state administration bodies.

   In addition to the draft Remediation and Reclamation Plan attached to the documentation (Annex No. 8), examine and discuss in follow-up proceedings the possibility of increasing the areas of succession without humus substrate up to 10% of the total area addressed by this plan (i.e. 12.9 ha).

   Expected effect of the measure: Minimization of negative impacts on flora, fauna, habitats and biodiversity. Optimization of the subsequent use of the territory, taking into account the interests of the public and local governments.

8) At the stage of permitting mining activities, prepare a Biological Monitoring Plan. Consult it with the nature conservation authorities in the next stages of project preparation. Monitoring should include:

a) monitoring the condition of areas not yet affected by mining in order to specify data on the occurrence of rare and specially protected species of plants and animals
b) Monitoring of active areas (mining, roads, hinterland) to minimize the spread of ruderal and alien species.
c) Monitoring the condition of the reclaimed area in order to evaluate the effectiveness of conservation measures (transfers, planting, creation of substitute habitats), to refine data on successional processes and to minimize the spread of ruderal, unsuitable and alien species.
d) Biological monitoring should be initiated before the start of the implementation of the project to document the unaffected state.
e) This plan will also include the conditions granted in the procedure for granting an exemption from Section 50 of Act No. 114/1992 Coll., on Nature and Landscape Protection.

Expected effect of the measure: Minimization of negative impacts on flora, fauna, habitats and biodiversity. Ensuring continuous monitoring of the state of biota in the surroundings and thus creating a precondition for the immediate solution of non-standard situations and at the same time a basis for evaluating the proposed protective measures. Creation of an objective basis for updates to the Remediation and Reclamation Plan.

9) At the stage of permitting mining activities, prepare a Hydrogeological Monitoring Plan. Consult the content of the plan with the relevant state administration bodies and municipalities. The network of monitoring boreholes should only include boreholes around the perimeter of the spoil heap body, and no boreholes should be drilled from the spoil heap surface. A drainage system should be used to monitor the level of aquifer in the remediated and reclaimed parts of spoil heaps and water quality. After the completion of the remediation and reclamation of the area, the drainage system should be kept in working order, the outlet of the system should be closed, but equipment should be installed that will allow groundwater samples to be taken. Also monitor surface water in the surrounding small water reservoirs. In selected wells in Trnávka, monitor the level of groundwater and water quality.

   When designing hydrogeological monitoring, build on the existing monitoring (latest available report as of the date of preparation of the documentation: Lisovoi, 2022) and continue with it throughout the preparation of the project until the approval of the updated Hydrogeological Monitoring Plan for Continuous Monitoring.

   Expected effect of the measure: Minimization of negative impacts on water and rock environment. Ensuring regular monitoring of the water level in the vicinity and thus creating a precondition for the immediate solution of non-standard situations.

10) Prior to the commissioning of the plan to implement a new acoustic screen along the II/322 road in Chvaletice. The acoustic screen runs along the southern edge of road No. 322, connects to the existing screen by the road and continues westwards to the intersection with V Telčice Street. The screen has a total length of 476 m, a height of 3 m above the surface of road No. 322. The screen must be installed along the roadside at a distance of up to 1 m. The structure of the screen must have sound insulation at the level of at least R_w = 25 dB, the surface of the acoustic screen may be reflective (i.e. e.g. glass). The location of the screen is shown in Picture 8.6-1.A in Section 8.6.1 and also in Picture 8-6-5A in Section 8.6.5 in the acoustic study. An alternative is a different organization of shifts so that

passenger transport at night, i.e. before 6:00 and after 22:00, is not generated due to the plan.

Expected effect of the measure: Compliance with the hygienic limit for traffic noise at night in Chvaletice. A significant reduction in the nuisance of traffic noise to the inhabitants of Chvaletice.

11) Prior to the commissioning of the plan, the owner of the building Zdechovice No. 7 was offered the implementation of the noise protection measure at the building Zdechovice No. 7. The measure will ensure that the protected interior spaces of buildings with windows only to the northern façade to the I/2 road will also have windows to the side eastern façade, alternatively such spaces need to be ventilated by a system independent of the opening of the windows.

    Expected effect of the measure: Compliance with the hygienic limit for traffic noise during the daytime in Zdechovice, or not deterioration of the current unsatisfactory condition.

12) At the stage of permitting mining activities, prepare a flood plan. In addition to clear guidelines for the event of expected floods on the Elbe, the plan should also preventively address the optimization of mining and remediation procedures so that a long-term lowered terrain elevation is not left on the edges of the project in contact with the floodplain.

    Expected effect of the measure: Minimization of flood damage.

13) At the stage of permitting mining activities, a detailed project of the main quarry road is to be prepared. The road must allow regular machine cleaning, it will be designed as a reinforced road with a cement-concrete surface.

    Expected effect of the measure: Minimizing the impact on air quality through the reduction of resuspended dust.

14) Before the commencement of earthworks, to carry out the transfer of broad-leaved helleborine specimens from the plant premises according to the proposal in the biological assessment (Janda, 2019).

    Expected effect of the measure: Minimisation of the impact on a specific species on the Red List, i.e. without the need for an exemption for specially protected plant species.

15) In the phase of the building permit procedure (or the permit procedure), design all external lighting, including the lighting of the inner areas and roads, in accordance with the requirements of the methodological guideline for the prevention and reduction of light pollution of the Ministry of the Environment of 30 June 2020 under ref. no. MZP/2020/710/2387 and the technical standard ČSN 36 0459 – Reduction of undesirable effects of outdoor lighting.

    Expected effect of the measure: Minimizing the impact associated with light pollution. Compliance with standard requirements even for the state of non-binding status of the Czech technical standard.

Measures for the construction phase

16) Install a cleaning system or implement cleaning procedures when leaving the construction site in the area of connection to public roads in order to prevent contamination of the road by construction site equipment.

17) After its construction, the temporary landfill at the western edge of the DP should be grassed (part of the soil is covered) in order to reduce the formation of dust due to the wind.

18) Incorporate air protection measures into the documentation for the implementation of the construction (including the removal of existing buildings) in accordance with the Methodological Guideline of the Air Protection Department of the Ministry of the Environment of the Czech Republic on Determining Conditions for Limiting Emissions from Construction Machinery and Other Construction Activities – September 2019.

19) Before the start of construction, inform the inhabitants of the surrounding buildings in a suitable form (e.g. by hanging a presentation banner at the entrance to the construction site) about the length and character of the individual construction phases. If the citizens affected by noise know the purpose and meaning of the noisy activity, then their response to this noise is more favourable and the stress response and discomfort are minimized. It is advisable to appoint a contact person to whom citizens can address their possible complaints, requests and questions. It is advisable to post the contact details of this person, e.g. at the entrance to the premises or another easily accessible place,

20) Do not carry out noisy construction work before 6 a.m. and after 7 p.m.

21) Limit the execution of the noisiest works to a shorter period of time within the all-day working hours and outside weekends and holidays, as far as possible.

22) Use modern machines and equipment with favourable acoustic characteristics and keep them in good technical condition.

Expected effect of the above measures for the construction phase: Minimization of the impact on the air and noise situation.

23) Initial field work on the plant premises should be carried out outside the breeding season and the presence of toads in the water (i.e. from the beginning of April to the end of August). No new wetland areas should be created during this work, as there is a risk that they will be rapidly colonized by toads and used for reproduction. In the opposite (less desirable) case, transfer the toads to a suitable substitute area in the vicinity (e.g. the littoral of the blind arm of the Elbe).

Expected effect of the measure: Minimizing the impact on a specific specially protected species. In the case of transfers, the measure is subject to obtaining an exemption from Section 50 of Act No. 114/1992 Coll.

24) At least one year before the liquidation of the newt spawning grounds (the occurrence was found in the area for the location of the temporary landfill west of the DP, i.e. the intervention will be in the construction phase), create at least the same number of potential spawning grounds in the vicinity of the project, or verify the suitability of existing ones (e.g. a revitalized pool and a blind arm east of the tailings). Before the start of earthworks, it is necessary to transfer newts to these new areas.

Expected effect of the measure: Minimizing the impact on a specific specially protected species. In the case of transfers, the measure is subject to obtaining an exemption from Section 50 of Act No. 114/1992 Coll.

25) Before the commencement of earthworks, to carry out the transfer of broad-leaved helleborine specimens from the plant premises according to the proposal in the biological assessment (Janda, 2019).

Expected effect of the measure: Minimisation of the impact on a specific species on the Red List, i.e. without the need for an exemption for specially protected plant species.

26) Incorporate the requirements for waste management according to the "Methodological Guidelines of the Waste Department of the Ministry of the Environment for the Management of Construction and Demolition Waste Management and Management" from 2018 into the documentation for demolition and construction.

Expected effect of the measure: Minimization of impacts associated with the production of construction and demolition waste.

For the operation phase

27) Time limitation of operation:

25a) The operation of raw material extraction and storage of mining waste in the mining area may take place only during the daytime (6:00 a.m. – 10:00 p.m.). This does not apply to the operation of the floating station located also in the mining area.

25b) The siding may be operated only during the daytime (6:00 a.m. – 10:00 p.m.) – it concerns the entry and exit of trains to/from the premises, the movement of trains on the siding and the loading/unloading of piece goods. Sulphuric acid bottling can also be carried out at night, as long as the wagons are moved by a winch or electric pusher.

25c) Service freight transport can only be operated during daytime hours (6:00 a.m. – 10:00 p.m.). This condition also applies to the passage of freight transport in the vicinity of the nearest villages, so it is recommended to limit the entry of trucks to/from the area, for example, to the period from 6:30 a.m. to 9:30 p.m.

25d) All traffic on the area roads in the closed area of the project will be out of operation at night (22:00 – 6:00). Employees of the plant and mining will use publicly accessible car parks to arrive on shifts.

Expected effect of the measure: Minimization of the impact on the noise situation. Compliance with hygienic noise limits, or not increasing the unsatisfactory acoustic situation in the surrounding settlements.

28) Acoustic monitoring will be carried out according to the Acoustic Monitoring Plan.

After the start of operation, noise measurements will be focused on verifying the acoustic situation in all surrounding settlements. In the coming years, noise measurement will respond mainly to changes in the acoustic situation caused either by changes in other projects or by changes in the location of mining machinery. For the second reason, compliance with the hygienic limit for daytime in the surrounding settlements will be checked. The acoustic study shows that the most problematic approach of the mining mechanization to the development in Trnávka will be, which, however, will only take place in the last years of the implementation of the plan, i.e. in a time horizon of more than 20 years. Although the Chvaletice power plant is a major source of noise here, if necessary, the noise level of the assessed project could be addressed by both organizational and technological measures. At this time, for example, mining equipment with significantly lower noise parameters based on electric drive may be available.

Representatives of all affected municipalities in which the measurement will currently be carried out will be regularly informed about the results of acoustic monitoring.

Expected effect of the measure: Monitoring and subsequent compensation of any adverse effects on the noise situation.

29) After the issuance of the building permit (decision on the approval of the project) for the construction of the plant and further during the entire lifetime of the project, implement

measures to strengthen the stands of non-forest trees on the notifier's land on the western and southwestern edge of the plant premises according to the management plan prepared under measure No. 6.

Expected effect of the measure: Minimization of impacts on the acoustic and air pollution situation and impacts on the landscape character. Compensation of impacts on woody plants growing outside the forest.

30) As part of the trial operation of the processing plant, subject mining waste deposited in spoil heaps (non-magnetic component, post-leaching component, their mixed sample) to leachability analyses and, if necessary, further analyses. For those parameters that will show significantly higher concentrations than expected, assess the possible risks associated with possible leaks of such substances into groundwater.

In the case of extremely unfavourable results of leachability analyses, design and carry out appropriate treatment of the material before its deposition or incorporate additional protective layers into the composition of the hopper.

Expected effect of the measure: Elimination of the current uncertainty resulting from the unspecified composition of mining waste. Minimizing the risks associated with potential contamination of water or the soil environment.

31) Carry out biological monitoring according to the Biological Monitoring Plan, evaluate the results regularly. The expected minimum frequency is once every 2 years, according to the requirements of the nature conservation authority even more often (especially inspection of currently hidden areas as part of rescue transfers).

Expected effect of the measure: Minimisation of impacts on flora, fauna and biodiversity.

32) The results of biological monitoring carried out during mining should be used for optimization and refinement of remediation and reclamation work.

Expected effect of the measure: Improvement and optimisation of reclamation procedures. Minimizing negative impacts on biota, ensuring conditions for the possibility of recreational use of the site.

33) Implement specific measures to minimize the impact on identified specially protected animal species. The measures listed below are based on the results of the biological assessment and should be seen as recommended. The final form of the measures is determined by the nature conservation authority as part of the exemptions from Section 50 of Act No. 114/1992 Coll., on Nature and Landscape Protection:

a) With regard to the protection of birds, the removal of trees and the overburden of the humus layer should be carried out only in the period from the end of September to the end of February, so as not to disturb during courtship, nesting and raising of the young. The measures also serve to protect the red squirrel.

b) At least one year before the overburden in the mining area, carry out an up-to-date survey of the occurrence of nests (ants occasionally move their nests), transfer the nests found to a biotopically similar area in the vicinity of the project (or to an area that has already been reclaimed). When choosing a replacement area, it is necessary to emphasize the absence of competing ants (of the same species and species with similar food requirements).

c) Prior to the commencement of overburden in the mining area, transfer of found individuals of the present species of reptiles and amphibians to biotope-like areas in the vicinity (transfers should be carried out in suitable weather – warm and sunny, in order to minimize overlooking of hidden individuals). The transfer can also be carried out to an area that has already been reclaimed.

d) To support (e.g. by overseeding) the occurrence of nutrient plants (e.g. thistle, plume thistles, dandelion, clover, thyme, comfrey, goat willow, dead-nettles, peavines, etc.) for bumblebees.

e) Plant substitute solitary thorny shrubs (hawthorn, rosehip, blackthorn), which can be used by shrike and corn bunting for nesting and shelter.

f) In parts of the territory where a high number of visitors is not expected, the ruderalis character of the habitat should be retained, or the presence of shrubs and extensive management (small-scale mowing carried out at the end of summer) should be ensured. This measure is suitable for grey partridges, common quail and whinchat.

g) Leave on the top of the reclaimed spoil heaps of the enclave without a layer of humous soil, i.e. with a sandy loamy non-humous substrate for the development of xerothermic habitats.

Expected effect of the measure: Minimisation of impacts on flora, fauna and biodiversity, in particular prevention of killing, injury and disturbance of specific individuals and minimising the impact on their reproductive cycle. Support of biodiversity in the reclaimed area.

34) Carry out monitoring of surface and groundwater according to the Hydrogeological Monitoring Plan, and regularly evaluate the results. The expected minimum frequency is once a quarter, or according to the requirements of the water management authority.

Expected effect of the measure: Prevention of groundwater and surface water pollution and the possibility of timely response in the event of non-standard and emergency situations.

35) To pay constant attention to minimizing non-standard operating conditions and adhering to work and technological discipline. Handling of substances that may endanger the quality of surface water or groundwater should preferably be carried out in a secured parking area in the technical facilities of the mining plant. When refueling machines in the mining plant (crawler excavator or dozer), use a sump tray.

36) Carry out regular inspections of technical security in the management of substances that may endanger the quality of surface or groundwater and, if necessary, implement remedial measures without delay.

37) To keep the mechanisms used in good technical condition and to prevent oil spills in particular by means of preventive measures and regular inspections.

38) Regular maintenance and servicing of machine mechanisms is to be carried out exclusively on a secured parking area in the technical facilities of the mining plant. Trucks should be parked in this area after working hours.

39) Do not use chemical agents (road salts) during winter maintenance.

40) Provide appropriate means for liquidation of possible accidental oil spills.

Expected effect of measures No. 14 - 20: Preventive measures will ensure the prevention of pollution of groundwater, surface water, soil and rock environment, also in connection with emergency preparedness.

41) Based on the results of regular biological monitoring, carry out eventual elimination of invasive and alien species.

Expected effect of the measure: The measure will ensure the conservation of biodiversity on a local scale and prevent the spread of invasive and alien species.

42) Implement measures for air protection in the field of mining:

a) Minimize the area of overburden deposits, prefer immediate use of overburden materials for the reclamation of spoil heaps. Grass the surface of spoil heaps and plant trees as soon as possible. The area with overburden should be left with a maximum area corresponding to the annual mining process.

b) The days on which the overburden will be manipulated should be chosen so that they are days with a low risk of excessive dustiness. Overburden should be carried out outside of dry and windy periods.

c) Areas that are intended for subsequent vegetation modifications should be planted as soon as possible after the completion of the work so that the new vegetation will be ground cover as quickly as possible. Where it is not possible to plant vegetation, use jute canvas, mulch, or the application of other solutions to increase the cohesion of the surface.

d) Material from the temporary dump at the western edge of the DP should be taken from the eastern side oriented towards the tailings. The western windward side facing the village of Chvaletice will be grassed and maintained by mowing.

e) Maintain a dust-free surface of quarry roads. This means that the main quarry road will be reinforced and must be regularly machine-cleaned. Unpaved quarry roads will need to be sprinkled in the event of prolonged drought. In case of excessive drying, sprinkle the mining workplace and other temporarily exposed areas or landfills.

f) Regularly clean all machinery and means of transport. Carry out regular inspections of their technical condition.

g) Minimise gradient heights when loading and unloading.

h) Use non-road mobile machinery that meets at least Stage II emission requirements

i) Use trucks that meet at least the EURO V emission standard

j) Reduce the idling of trucks and machinery to a minimum

k) Limit the speed of traffic in the area on the roads in order to prevent excessive dust from the movement of trucks and machinery

Expected effect of the measure: Measures to minimise the impact on air quality. This is a preliminary draft of measures. These measures will be further refined in the next phases of the preparation of the plan. As part of further project preparation and permitting processes, the impact on air quality will also be the subject of proceedings for the issuance of binding opinions pursuant to Section 11 (1) of the Act. 2 lit. b) (for the determination of the mining area, for the zoning procedure, for the mining activity permit) and the decision on the operation permit pursuant to letter a) of the Mining Act. c) Act No. 201/2012 Coll., on Air Protection.

For the phase-out of mining, remediation and reclamation

43) After the completion of the remediation and reclamation of the area, the drainage system should be kept in working order, the outlet of the system should be closed, but equipment should be installed that will allow groundwater samples to be taken. Continue groundwater monitoring according to the Hydrogeological Monitoring Plan for at least another 5 years. Furthermore, to follow the conditions for the operation of the disposal site set within the proceedings pursuant to Act No. 157/2009 Coll., on Mining Waste Management, including the provision of a reserve of funds pursuant to Section 13 of this Act.

    Expected effect of the measure: The measure will make it possible to respond to possible non-standard and unexpected facts, failures of the insulation system, etc. This minimizes the risk of potential contamination of groundwater and surface water.

44) Similarly, to the previous point, ensure continued biological monitoring for at least 4 years (i.e. at least 2 more times) after the handover of reclaimed land to its new owners or users.

    Expected effect of the measure: The measure introduces post-project monitoring with the aim of maintaining a long-term satisfactory state of biota in the site and specifying management measures for further management and maintenance of the land.

In addition to the above-mentioned conditions, it is also a matter of course to act in accordance with legislative requirements and the requirements of the relevant administrative authorities. As part of the measures for prevention, exclusion, reduction, or compensation of adverse impacts, the obligations to obtain approvals and decisions of the relevant administrative bodies in the field of protection of individual components of the environment are not mentioned. These are the necessary administrative steps required by legislation. Without obtaining the appropriate approvals, the project cannot be implemented. These consents will contain additional and specified conditions for the implementation of the plan.

V. CHARACTERISTICS OF THE FORECASTING METHODS USED AND THE INITIAL ASSUMPTIONS AND EVIDENCE FOR THE IDENTIFICATION AND ASSESSMENT OF SIGNIFICANT IMPACTS OF THE PROJECT ON THE ENVIRONMENT

Methodological instructions for the preparation of documentation on the environmental impact assessment of the project in question are Act No. 100/2001 Coll., or its Annex No. 4.

The actual assessment of environmental impacts was preceded by obtaining information and comprehensive knowledge about the current state of the environment in the affected area and its wider surroundings in general and in connection with the issue being addressed, from various sources. These sources were:

- professional literature,
- expert studies prepared for the purposes of documentation for the area of interest approximately in the years 2015 – 2022,
- map data (administrative, thematic maps, internet map applications),
- legislation
- official documents – decisions, statements and opinions of state administration bodies,
- documents and documents of professional institutions,
- expert studies,
- freely available published data (internet),
- f ield survey and measurement information
- data provided by municipalities.

Individual tasks were assigned to assess partial areas of expertise during the processing of the entire documentation. The outputs of these tasks (studies) predict impacts on partial components of the environment.

Prediction and assessment of the project's environmental impacts was carried out:

- on the basis of exact prediction(s),
- based on an expert estimate,
- by analogy,
- using applicable legislation and recommended methodologies.

Furthermore, the forecasting methods used and the fundamental initial assumptions for each key influence are described.

Noise

A 3D contour model of the calculation was created with a ground plane at the ground level of the intersection of the entrance to the project, i.e. about 212 m above sea level. The noise calculation was performed according to the following methodologies implemented in CADNA A version 2023:

- Noise from car traffic: CNOSSOS EU
- Rail noise: CNOSSOS EU

  CNOSSOS EU = European Methodology for Calculating Noise. The calculation is performed in octave bands from 31.5 to 8000 Hz. See methodological manual: JRC Reference report CNOSSOS-EU, ISBN 978-92-79-25281-5, Luxembourg 2012,

available from: https://op.europa.eu/en/publication-detail/-/publication/80bca144-bd3a-46fb-8beb-47e16ab603db/language-en.
The methodology is updated within the CADNA A 2023 software.

- Noise from stationary noise sources and production sources in the area:
Calculation methodology selected according to ISO 9613. Real noise sources are replaced by theoretical sources of point, area, line or volume noise source. The computational model takes into account the absorption of surfaces (concrete and brick walls of houses, sheet metal, wooden, glazed structures, ...). The calculation is performed in the third-octave bands of 25 to 10,000 Hz, as attenuation, reflection/absorption and defined spectra of noise sources are frequency dependent.

The noise measurement was carried out by an authorized laboratory in accordance with Government Regulation No. 272/2011 Coll., as amended by Government Order No. 217/2016 Coll., according to the methodological instructions of the Ministry of Health No. MZDR 47681/2017-2/OVZ and the laboratory's own operating procedure SOP A-2 + A-4.

Air

The calculation of short-term and average annual concentrations of pollutants and the time of exceeding the selected limit concentrations was carried out according to the "SYMOS 97" methodology (System of Modelling of Stationary Air Pollution Sources SYMOS´97 – update 2013), which was issued by the Ministry of the Environment of the Czech Republic in 1988.

In the course of the following years, the methodology was modified and supplemented with new procedures and output parameters (the possibility of calculating daily and eight-hour concentrations, calculating air pollution concentrations of NO and$_{NO2}$ based on NOx emissions, etc.) so that its outputs comply with the applicable legislation.

This methodology is based on the assumption of a Gaussian concentration profile on the cross-section of the smoke plume. It makes it possible to calculate short-term and annual average concentrations of pollutants in the network of reference points, as well as the periods of exceedances of selected limit concentrations (e.g. pollution limits and their multiples) per year, the shares of individual sources or groups of sources in the annual average concentration at a given location, and the maximum achievable concentrations and conditions (air stability class, wind direction and speed) under which they may occur. The methodology includes corrections for the vertical ruggedness of the terrain, takes into account the yawning and increase of wind speed with height, and takes into account the distribution of wind direction and speed frequencies when calculating average concentrations and the time of crossing boundary concentrations. Calculations are made for 5 classes of atmospheric stability (i.e. 5 classes of the ability of the atmosphere to disperse impurities) and 3 classes of wind speed.

The wind rose for the site in question was determined by the Czech Hydrometeorological Institute for the site.

Data on the air pollution background were taken from the Czech Hydrometeorological Institute (CHMI) as the last available five-year averages in accordance with the applicable legislation.

Emission factors for individual sources were determined from respected national and international sources:

- Act No. 201/2012 Coll., on Air Protection,
- Decree No. 330/2012 Coll., on the method of assessing and evaluating the level of pollution, the scope of informing the public about the level of pollution and in smog

situations,

- Decree No. 415/2012 Coll., on the permissible level of pollution and its determination and on the implementation of certain other provisions of the Air Protection Act,
- Five-year averages 2017 - 2021, graphical representation of air pollution concentrations in the Czech Republic, Czech Hydrometeorological Institute, on-line,
- Communication of the Air Protection Department of the Ministry of the Environment, which determines emission factors according to Section 12, paragraph 1, letter b) of Decree No. 415/2012 Coll., on the permissible level of pollution and its determination and on the implementation of certain other provisions of the Air Protection Act, www.mzp.cz, Bulletin of the Ministry of the Environment, December 2021,
- Paper "Methodology for estimating fugitive emissions of solid pollutants from open-pit mines, fuels and other minerals", www.mzp.cz/průmysl_energetika,
- Final report on the first sub-task - Elaboration of the proposal of emission factors for the Ministry of the Environment, prepared by the Technical Service of Air Protection Prague a.s., February 2015 (www.mzp.cz),
- United States Environmental Protection Agency (US EPA) "Compilation of Air Pollutant Emission Factors (AP42" (EPA-AP42), first published in 1972, current version,
- US EPA AP42 – Chapter 13.2.1 "Paved Roads", www.epa.org,
- US EPA AP42 – Chapter 13.2.2 "Unpaved Roads", www.epa.org,
- US EPA AP42 – Chapter 13.2.4 Aggregate Handling And Storage Piles, www.epa.org,
- EMEP/EEA air pollutant emission inventory guidebook 2016, Technical guidance to prepare national emission inventories – part 1.A.3.c Railways 2016, European Environment Agency (EEA),
- Methodology for calculating the environmental benefits of projects aimed at reducing the resuspension of solid pollutants into the air due to transport - Methodology of the State Environmental Fund of the Czech Republic from June 2011,
- Traffic study "Recycling of the Chvaletice – Trnávka tailings – update of the road connection study", Study update from 11/2019, prepared by SUDOP PRAHA a.s., Prague 3, June 2022,
- Dispersion study prepared for the project "Asphalt mixing plant of the company Bauset – Chvaletice", October 2015, processed by RNDr. Tomáš Bajer, CSc., Ing. Martin Šára, Ing., Jana Bajerová, ECO-ENVI-CONSULT, Jičín
- Design documents submitted by the sponsor of the dispersion study

Public Health

The aim of the Public Health Impact Assessment (HIA) is to assess the significance of health risks arising from the effects of physical and chemical factors related to the assessed project. The assessment applies only to the normal operating conditions of the project, i.e. in compliance with the legal and technical regulations, technologies, capacity and character of the project specified in the documents, it does not address situations in case of non-compliance with the specified conditions and in cases of extraordinary events, e.g. natural disasters or accidents.

The basic methodological procedures for estimating health risks have been developed mainly by the US Environmental Protection Agency (US EPA) and the World Health Organization (WHO). In the Czech Republic, the basic methodological documents for health risk assessment were issued by the Ministry of Health and the Ministry of the Environment. The Authorization Guide for the Assessment of Health Risk of Exposure to Chemicals in Outdoor Air AN 17/15, which was prepared by the National Institute of Public Health (NIPH), the results of the WHO HRAPIE project (Health Risks of Air Pollution in Europe) and other documents are used. The presented health risk assessment is prepared in accordance with these methodological procedures.

Health risk expresses the likelihood of a change in the health status of exposed people. When assessing health risks, there are four standard follow-up steps:

- Hazard identification – this step determines whether the substance, factor or complex mixture of interest is capable of causing an adverse health effect.
- Hazard characterisation – estimation of the dose dependence of this effect, i.e. how the intensity, frequency or likelihood of adverse reactions changes with dose, which is a prerequisite for estimating the level of risk
- Exposure assessment (estimation) – i.e. whether and to what extent the population is exposed to the substance or factor of interest in a given environment. Based on the knowledge of the situation, an exposure scenario is compiled, i.e. an idea of the routes and intensity and amount of exposure to a given substance and its dose.
- Risk characterization – is a specific step in risk estimation. It means the integration (synthesis) of the knowledge gained in the previous steps, including consideration of all uncertainties, severity and weaknesses of the documentation. The purpose is to arrive at a quantitative expression of the level of a specific health risk in the assessed situation, if the available information allows it, which can serve as a basis for decision-making on measures, i.e. for risk management.

Landscape character

To process the actual (causal) assessment of the impact on the landscape character, the methodological procedure "Assessment of the impact of the *proposed construction, activity or change of land use on the landscape character, the so-called method of spatial and character differentiation of the area*" by I. Vorel, R. Bukáček, P. Matějka, M. Culka and P. Sklenička was used. This methodology introduces procedures that use methods used in architectural and landscape composition, using standardized evaluation steps and objectified, universally accepted judgments. The method of assessing the impact of the proposed project on the landscape character is based on the principle of protection of such characteristics, features and values of the landscape character that are significant attributes of the natural and aesthetic quality of the landscape and on the elimination of influences reducing this quality. Another principle of the method is to decompose the overall evaluation problem into partial, independently solvable steps. The aim is therefore to divide the subjectivity of the evaluation into a number of minor decisions and to eliminate any inaccuracies and deviations resulting from more or less subjective views. By default, the problem layout is performed:

- spatial and character differentiation – distribution into character-homogeneous parts of the landscape – areas of landscape character (also referred to as basic landscape units, characteristic landscape units, etc.) and places of landscape character (also referred to as affected landscape areas, partial landscape areas, etc.),

- identification of signs and values of natural, cultural and historical characteristics of the landscape character in areas and places of landscape character,
- Assessment of the degree of impact of the proposed project on the identified features and values.

The output of the assessment is a conclusion in which the extent of interference of the proposed project into:

- natural, cultural or historical characteristics;
- natural and aesthetic values,
- Significant Landscape Elements (VKP)
- Specially Protected Areas (SPAs)
- cultural landmarks,
- harmonious scale and relationships.

The conflictuality of the interventions is determined by the intensity of the interventions in the individual features of the landscape character, the meaning, manifestation and value of these features.

In addition to the methodological instruction described above and the data provided by the client, thematic maps of various scales, findings made by field research, professional literature, the internet, and photographic documentation were used as additional documents.

Groundwater and surface water

A separate assessment of water conditions in the area of interest was prepared for the evaluation, which summarizes the results of other professional hydrogeological works. (Frydrych, 2022)

As part of the hydrogeological survey (Francírek, 2019), a number of expert works were carried out (research work, drilling work, camera tests, sampling and analysis of soil and water samples, hydrodynamic tests on boreholes and others).

The drilling work was carried out in two stages, during which 12 functional hydrogeological boreholes and 1 unequipped borehole were drilled. The hydrogeological boreholes were equipped with PVC pipes with a diameter of 100 or 110 mm. In the first stage, the plastic equipment of the boreholes was supplied by a drilling company and in the second stage it was provided by a contractor from GETRA s.r.o. The plastic equipment from GETRA s.r.o. was perforated with a special wound filter with a size of 0.2 mm. The plastic equipment was covered with gravel with a fraction of 4/8 mm or washed sand with a fraction of 0/2 mm. All hydrogeological boreholes are equipped with a steel head with a hinged and closable lid.

During the drilling work, 37 oriented samples of soils and sludges were taken for silicate, sorption and sequence analyses needed for model creation. All samples taken were documented and described by the geologist present. The samples for analysis were wrapped in shrink wrap to preserve the original moisture content of the sample as much as possible. The samples taken for the investor were stored in plastic buckets. All soil analyses were carried out by the Department of Geological Sciences of the Faculty of Science, Masaryk University.

Groundwater and surface water analyses were carried out by an accredited laboratory of the Institute of Public Health based in Ostrava, Jihlava branch.

Hydrodynamic tests on newly drilled boreholes in the body of the tailings were originally designed as infusion tests, as it was assumed that only a very small water column would be found, which would not allow a pumping test to be carried out. Contrary to expectations, it was found that the body of tailings impound I is aquiferous at the base; The thickness of the saturated zone reaches up to 5 m (level 20.42-21.75 m below the ground) depending on the fluctuations of the water level. For this reason, a pumping test and a subsequent climbing test were also carried out at tailings pond I. The hydraulic characteristics of the aquifer environment were determined using the Aquifer Test Pro software (Waterloo Hydrogeologic Ltd.). A computational method based on the relationships derived for the unsteady radial flow of groundwater to hydraulically complete boreholes was used.

The work also included geochemical modelling. The Geochemist's Workbench (GWB) program was used to build the geochemical model. The model is a model of stability and is based on the principles of thermodynamics (the time evolution of the system is not taken into account). The advantage of this approach is that we do not deal with the path by which the system will change from an unequilibrium to an equilibrium state. It only shows the direction in which the changes will take place. The basis of geochemical modelling is based on quantifying the value of the Gibbs function and looking for its minimum for given conditions – pressure, temperature and composition of the system. The system changes the phase composition and redistributes the individual components between phases so that the minimum of the Gibbs function is reached.

The flow of groundwater and the transport of dissolved substances at the Chvaletice site was simulated by Modflow and MT3DMS using the graphical user interface Groundwater modeling system (GMS) developed by Aquaveo. The Modflow program is based on the finite difference method and enables three-dimensional flow simulation in a fully saturated environment. The MT3DMS program allows simulation of the transport of substances dissolved in water, taking into account transport mechanisms such as advection, dispersion, diffusion and chemical reactions such as disintegration and sorption.

Further details on the methodology are provided in the final report of the HG survey.

As part of the hydrogeological monitoring, the physico-chemical parameters of groundwater and the monitoring of selected substances in groundwater were carried out.(Lisovoi, 2022)

Measurement of physico-chemical parameters includes measurement of pH, redox. potential, dissolved oxygen (in % and mg/l), electrical conductivity and temperature. The measurement was carried out using the Hanna Multiparameter HI 98194 pH/EC/DO instrument. First, a sufficient amount of water (if possible) was taken from the hydrogeological objects into a plastic bucket by means of a steel sampling cylinder, in which the physico-chemical parameters were stabilized for approximately 5 minutes. The measured values of the monitored parameters were recorded and subsequently processed in MS Excel. These measurements were carried out for the purposes of a possible compilation of a numerical model of the spread of selected pollutants through groundwater.

Since 2016, groundwater samples have been taken from monitoring facilities and their chemical analysis in order to identify significant pollution and its development over time. Every year, the sampling network was modified depending on the results obtained. The monitoring network included a total of 26 objects, but it was not always possible to take a water sample (insufficient amount of water for sampling, completely dry borehole, inaccessible borehole due to crops, etc.).

The samples were taken statically by a steel cylinder and the water was then poured into prepared and labeled sample containers. Groundwater analyses were carried out by an accredited laboratory of the Institute of Public Health based in Ostrava, Jihlava branch. Sampling was carried out from January 2021 to December 2021 once a quarter. The range of monitored elements and compounds is given in the technical report of HG monitoring.

Biological assessment

The survey of the area was focused on determining the current biological state of the site and the occurrence of specially protected species of plants and animals, listed in the Decree of the Ministry of the Environment No. 395/1992 Coll., as amended, to Act No. 114/1992 Coll., on Nature and Landscape Protection, as amended, and other species of conservation importance.

The presence of invertebrates was determined by individual collection, ground traps, white bowls, laying food baits and skidding vegetation. The survey of invertebrates was focused on specially protected, rare and bioindicator species. Special attention was paid to selected taxa of Hymenoptera and aquatic invertebrates. From the order Hymenoptera, attention was focused on the stinging Hymenoptera from the superfamily Chrysidoidea, Vespoidea (except ants) and Apoidea. Most of the specimens were obtained by trapping them in yellow Moericke traps. Yellow bowls with a diameter of 22 cm and a depth of 3 cm were used, which were placed on areas with a large abundance of stingers and with a probability of catching bioindicatively interesting species. The bowls were filled with saline solution with detergent. The traps were installed at the turn of August and September 2016 and the second round in July 2017. The stinging Hymenoptera were also caught by mass skidding into an entomological net and additionally by targeted collection on plant flowers. In the results, genera and species are sorted alphabetically within the families. For each species, the total number of individuals with sex differentiation is given, as well as biogeographical, ecological and faunistic notes and inclusion in the Red List of Endangered Species of the Czech Republic. The survey of Hymenoptera was carried out by Daniel Benda. The survey of aquatic invertebrates was carried out on an unnamed tributary of the Elbe from the village of Trnávka and in the section of the left bank of the Elbe from the confluence with this stream to the beginning of the boat mooring in the cadastre of the village of Chvaletice. (2009)

The presence of vertebrates was recorded using short-term traps, visually, acoustically, using residence signs, camera traps and bat detectors. Flying bird species were also recorded.

The results of the botanical and zoological surveys were obtained during fieldwork that took place from June to October 2016, from March to August 2017, from March to October 2019 and their updates carried out in the growing season of 2021 and 2022. In addition to the data obtained during the survey, literary data on the site and data from the Nature Conservation Finding Database were also used.

Dendrological surveys

The dendrological survey (evaluation of individual parameters) was carried out on the basis of the methodology of the Nature Conservation Agency of the Czech Republic – Valuation of trees growing outside the forest, including the calculation of compensation measures for felled or damaged trees (Kolařík et al., 2022). Most of the area of interest was already evaluated in 2017 on the basis of the original AOPK methodology from 2013. This is the area of the proposed DP Trnávka. For the purposes of evaluating the stands according to the updated methodology from 2022, data from this original survey were used. In addition, in 2022, field work was carried out on areas outside the proposed DP. A survey was carried out on the premises of the processing plant in 2019 according to the AOPK methodology from 2017. The methodology does not contain significant differences compared to the one from 2022, so the survey was left unupdated, it is sufficient for the needs of environmental impact assessment. In the next phases of the project preparation, i.e. especially for the permission to cut down trees, further updating of the surveys is not excluded.

Socio-economic study

The elaboration of this study is based on a combination of quantitative and qualitative approaches to evaluation. Based on quantitative data, the current economic development and trend of the locality and the whole region (i.e. a view of the current labour market, unemployment, commuting, company structure, wages and other socio-economic characteristics of the area) are visualized and evaluated for each topic. In the following sections, the potential benefits of future investment in the labour market, the competitive environment in the region and in the broader context of the national economy are qualitatively (deductively) assessed. Therefore, the study takes into account both the microeconomic perspective (i.e. changes in the location of local companies, the transformation of supplier and customer relationships in the micro-region etc.) and selected macroeconomic contexts, as the planned volume of the investment (approx. CZK 8 billion) far exceeds the investment of a "small" scale and will undoubtedly be reflected beyond the scope of the given location.

VI. CHARACTERISATION OF ALL DIFFICULTIES (TECHNICAL OR KNOWLEDGE GAPS) ENCOUNTERED IN THE PREPARATION OF THE DOSSIER AND THE MAIN UNCERTAINTIES ARISING FROM THEM

The uncertainty of the noise study is mainly due to the uncertainty of the input data, the uncertainty of the modelling itself and the uncertainty given by the acoustic knowledge of the user of the program (processor). The calculation uncertainties reported by acoustic processors are usually determined formally and are not based on a true uncertainty analysis. The purpose of the acoustic study is to estimate the expected impact of the projected situation, or the proposal of noise protection measures, in order to obtain information on the degree of probability that the hygienic limit will not be exceeded after the implementation of the proposed project. The input data has the character of the maximum possible value. The results obtained from the calculation model entered in this way are then the upper estimate of the expected situation and the relevant uncertainty is already applied (included) and it is not relevant to further work with the uncertainty of the calculation (add or subtract).

The author of the acoustic study states that the uncertainty of the calculation of LAeq,T (dB) values (equivalent sound pressure level A over time T) is at the level of ±2 dB.

The uncertainty in determining the current acoustic situation in the area is given by a series of acoustic measurements in the area. The measurement uncertainty is 1.8 dB. The comparison of the measured and modelled values shows a very good accuracy of the acoustic model.

For the main sources of noise in the mining area (machines and vehicles), the noise values were taken directly from the manufacturer's documentation, so they can be considered very accurate.

The evaluation of the results and conclusions of a dispersion study is always associated with certain uncertainties. In the case of this assessment, the uncertainties can be enumerated as follows:

1. Reliability of calculated air pollution concentrations by the dispersion model used. The basis of the methodology is a mathematical model, which by its very nature means simplification and impossibility of describing all the processes in the atmosphere that affect the dispersion of pollutants. Therefore, even the calculated results are necessarily burdened with a certain error and cannot be interpreted strictly.
2. Climate input data are average values of individual variables over a longer period of time. The actual course of meteorological characteristics in a given year may differ significantly from the average contained in the wind rose (e.g. occurrence of inversions, existence of more dispersion-favourable years with fewer smog episodes, etc.).
3. Uncertainty inherent in the values of the input data of the calculation. Overall, a conservative method was used in the calculation of emissions, which overestimates the actual emissions for reasons of precaution (relating to the operation of maximum daily traffic volumes for the whole year, calculation and evaluation of cumulative air pollution contributions).
4. Uncertainty inherent in the values of emission factors from the MEFA13 database. The gradually updated database (MEFA02, MEFA06) also contains several orders of magnitude differences in emission factors, e.g. for benzo(a)pyrene. With regard to the fact that the concentrations of benzo(a)pyrene measured at air pollution stations show a significant seasonal character with maxima in the heating season, it is possible that the air pollution contributions of the road transport calculated using emission factors are also overestimated.

5. Furthermore, the prospective traffic volumes contained in the traffic engineering documents, which are the input data of the RS calculation, are also the result of models and may thus be burdened with a certain error.

According to Part B of Annex No. 6 to Decree No. 330/2012 Coll., the SYMOS´97 model is a reference method for modelling. According to Annex No. 1 to Decree No. 330/2012 Coll., the modelling uncertainty is determined for selected pollutants according to the following table.

Table No. 711: Modelling uncertainty for selected pollutants according to Annex No. 6 to Decree No. 330/2012 Coll.

	SO2, NO2, NOx, CO	**Benzene**	**Particle PM10, PM2.5, lead**	**Ozone, related NO and NO2**	**Benzo (a)pyrene**	**As, Cd, Ni**	**PAH, Mercury Gas**	**Total deposition**
Modeling uncertainty for								
Hourly averages	50%	-		50%	-	-	-	-
Eight-hour averages	50%	-	-	50%	-	-	-	-
Daily averages	50%	-	-	-	-	-	-	-
Yearly averages	30%	50%	50%	-	60%	60%	60%	60%

Any health risk assessment is inevitably associated with certain uncertainties, given by the data used, exposure factors, estimates of the behaviour of the exposed population etc. Therefore, one of the indispensable parts of the risk assessment is the description and analysis of the uncertainties associated with the assessment and of which the processor is aware.

All the uncertainties listed below were addressed by adopting a conservative model that represents the worst-case scenario, i.e. long-term continuous exposure to the highest quantified levels of air pollution and environmental noise contributions.

To quantify the risk of the exposed population, data from the Czech Statistical Office with the situation as of 1 January 2022 were used for the entire population of the built-up area of the municipalities of Chvaletice, Zdechovice, Řečany nad Labem, Selmice, Labské Chrčice and Trnávka, for the separation of the Hornická čtvrť from Chvaletice also demographic data from the Health Yearbook of the Pardubice Region with the situation as of 31 December 2013 (more recent data are not available at the Institute of Health Information and Statistics of the Czech Republic), on which the highest values of monitored contributions of air pollutants quantified for the nearest residential area were related across the board. The composition of the population and the distribution of individual age cohorts may differ slightly from the regional average in individual municipalities. In general, a conservative method has been applied for exposure estimation and risk assessment, which significantly overestimates the real exposure and thus the risk characterization, and the resulting conclusions are therefore on the side of safety.

To quantify the risk, generalizing values of individual variables were used in the calculations, whereby, for example, the amount of inhaled air per unit of time is characterized by considerable variability according to age, sex and physical activity, exposure to quantified values of chemical pollutants in the air does not occur continuously (fluctuations in concentrations during the year, spending most of the population's time in the indoor environment are not taken into account), etc.

Uncertainties are also introduced into the assessment of public health impacts by the regression coefficients used and reference values derived from the WHO, US EPA and other world scientific institutions from the results of epidemiological studies, the conclusions of which have different levels of reliability.

The assessment of exposure to air pollutants was carried out only as an estimate, as the processor does not have more detailed data on the population living in the evaluated site, in particular data on its composition, habits, occupational exposures, time spent outdoors, sensitive or resistant groups etc., so there are no more detailed data on the exposure scenario.

Modelling is more suitable for estimating long-term exposure than the results of noise measurement alone, which provide accurate data, but are dependent on the current situation and may not provide sufficiently valid and representative data in terms of long-term exposure. Computational models in an acoustic study can be influenced by the number and location of representative reference points. The reference points in the acoustic study were purposefully placed at the most exposed residential buildings, knowing that the situation would be more favourable in other parts of the residential area.

Another significant uncertainty in the context of noise assessment is again the fact that neither the exposure scenario of the inhabitants in the vicinity of the project nor the structure of the affected population is known. When processing acoustic models, it is not possible to take into account, for example, the layout of the inhabited buildings located closest to the project or along the transport routes, the orientation of the windows, the age structure of the inhabitants of the individual buildings, the length of stay of people in the given place etc. The described and used relationships between noise exposure and its effect cannot be considered absolutely valid under all conditions. It is always necessary to take into account the significant influence of specific local conditions and the different degree of susceptibility and sensitivity of the exposed population.

When characterizing the risk, the combined exposure to noise from different sources was not assessed, nor was the possible masking of noise by another source or, conversely, the potency of the effects of noise from several different sources considered. These phenomena have not yet been sufficiently researched and there is no recommended procedure for their assessment.

When assessing the impact of noise on human health, the uncertainties are mainly due to the inability of the physical parameters of noise that we have at our disposal to simply describe the physiological severity, i.e. the danger of the noise event. Furthermore, it is necessary to take into account that the effect of noise is variable not only interindividually, but also situationally, socially, emotionally and historically. In practice, therefore, it is not uncommon to encounter situations where people affected by noise do not confirm the validity of the set limits in specific conditions, because groups of very sensitive and, on the contrary, very resistant people are separated from the exposed population, who stand as if outside of quantitative dependence. Under various circumstances, these atypical reactions represent 5-20% of the entire population. An increased risk of significant noise nuisance must be taken into account by sensitive people, people who are concerned about a certain source of noise and people who feel that they have no way of controlling the noise situation.

As part of the uncertainty analysis, it should also be noted that the quantitative characterization of the risk of noise exposure, although it may give an exact impression, is only a qualified estimate. Therefore, it is always more appropriate to assess developmental tendencies than to compare the exact numbers of people who are likely to be bothered or highly disturbed in their sleep.

Dose-effect relationships from epidemiological studies, evaluation of noise exposure and use of the exposure scenario were carried out on the safety side during the evaluation.

Minimizing uncertainties in a relatively subjectively performed assessment of the impact on the landscape character lies in the decomposition of the overall assessment problem into partial, independently solvable steps. The aim is therefore to divide the subjectivity of the evaluation into a number of minor decisions and to eliminate any inaccuracies and deviations resulting from more or less subjective views.

In the case of botanical and zoological surveys, uncertainties were minimized by a suitably chosen date of fieldwork and the number of visits. The survey was carried out in several growing seasons, archival published results and data from the Finding Database of the Nature Conservation Agency were also used. Uncertainties are therefore minimized, yet regular and long-term biological monitoring is proposed, which should be initiated before the implementation of the project.

As part of the assessment of the impact on surface water and groundwater, uncertainties have been significantly minimised. Up-to-date hydrological and water quality data from the Elbe River Basin Authority and the Czech Hydrometeorological Institute were used. Detailed hydrogeological monitoring is used to assess groundwater quality. With regard to the fact that the project will not quantitatively affect groundwater (groundwater abstraction will not be implemented), there is no need to consider the uncertainties associated with it.

A significant uncertainty lies in the lack of knowledge of the exact chemical composition of the mining waste that will be deposited back into the DP as part of remediation and reclamation. The unusable ingredient will be subjected to multiple washing processes before storage in order to neutralize and remove residual chemicals. Selected samples from laboratory tests were subjected to leachability analyses, among other things. Preliminary results are sufficient for this stage of project preparation. Further specification of the properties of mining waste will be possible after obtaining its large-volume samples from the verification unit, which is currently in operation on the notifier's premises. The final verification of the technology and the acquisition of representative waste samples is expected at the end of the trial operation, i.e. in I.Q.2024. The method of construction, operation and security of the landfills will still be subject to permitting and evaluation procedures according to mining legislation, specifically according to Act No. 157/2009 Coll., and Decree No. 429/2009 Coll. The current design of the storage site is prepared in such a way that all risks associated with the construction and operation of the storage site are minimized. It is mainly about determining the safe slopes of the closing slopes of the spoil heaps and sufficient insulation. Insulation will be carried out towards the subsoil as well as towards the surface.

In the graphic parts of this documentation (especially in the pictures in the text) there are partial inaccuracies in the position and area of individual areas and objects. The reason for this is the source materials that are used from various sources of different scales, which can distort the resulting graphic summary and some of the information resulting from it.

All of the above uncertainties were considered in the impact assessment. Uncertainties are generally approached conservatively and the proposed measures to compensate, eliminate or minimize potential negative effects take these uncertainties into account.

PART E COMPARISON OF VARIANTS OF THE PROJECT SOLUTION (if presented)

The location of the project is based on the location of the mineral deposit. From this point of view, the location of the project is therefore invariant within the area of the exclusive deposit.

The specific mining intention at the deposit is based on the request of the notifier and is defined by the location of the deposit itself, specific property relations and potential conflicts of interest, both in the field of technical and transport infrastructure, as well as with regard to the potential impacts of the project on the environment and public health. The plan respects the requirement of the Ministry of the Environment to issue opinions on mining projects for a period of approximately 20 years (see above).

The intention is therefore designed in one variant.

When assessing the impact of the project on the environment, two variants are also considered, namely the project variant – which counts on the implementation of the plan and the zero variant – in which the plan is not implemented.

The zero variant (variant V0) is a reference variant (not an intent variant). It describes the situation in the event that the plan is not implemented as described in the project variant. The variant is used to compare the impacts related to the implementation of the project (noise, air pollution, traffic, landscape character etc.), or to determine their qualitative and quantitative differences and to evaluate the overall significance of the impacts of the project variant.

The project variant (VP variant) describes the state when the plan will be implemented. Mining will take place with the implementation process and technological solution described below. A description of the project variant, including inputs and outputs, is given in the relevant chapters of Part B of this text.

The subject of the impact assessment carried out in this text within the scope of this EIA documentation according to Annex No. 4 to Act No. 100/2001 Coll. is therefore de facto a comparison of the zero and project variants, which is carried out in Part D. It was found that the impacts related to the project do not prevent its implementation and the project variant can therefore be subjected to a further preparation and approval process.

During the preparation of the EIA notification, the following two sub-variants were taken into account, where the method of transport and storage of waste material after mining and the method of remediation and reclamation were also addressed.

Subvariants in terms of return transport of mining waste:

A. Trucks

B. by belt conveyor to the final place of disposal of mining waste

Subvariants in terms of remediation and reclamation:

R1. Creation of a body of water in the central part of the territory

R2. Remediation and reclamation without this body of water

Suboption B is no longer considered in this EIA documentation**. Similarly, the method of remediation and reclamation is no longer an option.** The proposal for remediation and reclamation of the area is a combination of variants R1 and R2, which aims to support the creation of wetland communities and the retention of rainwater in the area. From the first option, the dam has been preserved, which had the task of creating a permanent water area in the central part of the territory. At the same time, the proposed dam has a bottom outlet and the central depression will thus serve as a dry polder that will retain torrential rainfall and release it gradually. The concept of the arrangement of the valley bottom is then taken over from the second option – when a smaller recess below the ground level (0.5–1 m) is created as part of the technical reclamation around the riverbed draining rainwater leading through the central depression in the south-west direction to the dam. The formation of shallower depressions creates periodically flooded pools retaining rainwater in the area. This will enable the formation of hygrophilous or wetland communities with the assumption of support for particularly amphibious animals.

PART F CONCLUSION

The assessed project represents the recycling and remediation of the former tailings in the proposed Trnávka mining area on the manganese tailing deposits Chvaletice-tailings cells 1,2 and Řečany-tailings cell 3 and the construction of a modern processing plant in accordance with the best available techniques in the area of the existing Chvaletice industrial zone, which has the character of a brownfield.

The intention is to determine the mining area of Trnávka on the exclusive manganese ore deposits of Chvaletice-tailings cells 1,2 and Řečany-tailings cell 3 and subsequent mining activities consisting in the extraction of raw material in these deposits. The deposits are of anthropogenic origin and were formed by the deposition of waste from the flotation treatment of the raw material of the Chvaletice pyrite and manganese ore deposits. At the same time, the intention to use manganese ore can be perceived as an intention to recycle mining waste and remediate the area of tailings. The design and method of securing the tailings corresponds to the customs and technical possibilities at the time of their creation and no longer meets today's requirements for securing mining waste storage sites.

The raw material will be loaded by a hydraulic excavator with a backhoe bucket and transported by trucks to the pulping facility, where it will be mixed to form a slurry. The mining reservoir, mining facilities and the pulping faciity will be located in the southern part of the mining area between tailings cells No. 1 and 2. The slurry will be transported by pipeline to a processing plant that will be built in an industrial area south of the II/322 road. Here, it will be subjected to magnetic separation and acid leaching, purification and the obtained solution will be use to produce high-purity manganese metal and manganese sulphate. Waste from production will be neutralized, washed, dewatered and transported on strips back to the mining area, where it will be stored as mining waste and used for remediation and reclamation of the area. The base for remediation and reclamation will be insulated and drained after mining, the newly created spoil heap will be isolated, covered with soil and biologically reclaimed.

The submitter of the project is the organization MANGAN Chvaletice, s.r.o., with its registered office in Chvaletice, which is the holder of the decision to grant prior approval for the determination of the mining area and will therefore also be the holder of this mining area after the determination of the Trnávka mining area.

This text has been prepared with regard to the requirements of Act No. 100/2001 Coll., on Environmental Impact Assessment, and serves to assess the impacts of the project on public health and the environment. The EIA documentation has chapters describing the project including all inputs and outputs (part B), a description of the affected area (part C) and an impact assessment (part D). The purpose of the Public Health and Environmental Impact Assessment is, in accordance with the law, to obtain an objective expert basis for issuing a decision in subsequent proceedings. In this case, it is mainly the decision on the determination of the mining area, the decision on the mining permit and the decision on the location and permit of all constructions. Subsequently, the decision on the issuance of an integrated permit.

No impacts were evaluated in their significance (after assessing the magnitude of the impact, time range, reversibility and other attributes) as significantly unfavourable or such as would make it impossible to implement the project.

Adverse impacts are mainly associated with direct land occupation due to its higher biological value. In this way, the impact on specially protected and rare animal species, woody plants growing outside the forest and the impact on biodiversity in general is evaluated. However, these adverse effects are temporary, they will only last for the duration of mining. Due to the proposed method of remediation and reclamation, these effects are reversible and can be compensated by protective measures. It can be stated that the proposed method of mining and reclamation, which means gradual annual occupations and an accelerated return of the territory to a renaturalized state, significantly mitigates or minimizes the negative impacts. Most animals will have sufficient time to migrate from untouched areas to areas with already completed remediation and reclamation. Migration will also be supported, if necessary, by rescue transfers in accordance with the conditions set by the nature conservation authority as part of the procedure for exemptions from Section 50 of Act No. 114/1992 Coll., on Nature and Landscape Protection. It is also essential to have the right timing of tree felling and overburden work in order to cause as little damage as possible to animal individuals and their developmental stages. Immediate replacement planting of trees will be carried out on the reclaimed areas.

Furthermore, the impact associated with the annexation of the ZPF is assessed as slightly unfavourable. In the context of the whole project, however, the impact is acceptable, provided that the authority for the protection of the ZPF agrees. Administratively, the ZPF land with an area of 5.58 hectares will be incorporated into the proposed DP with a total area of approximately more than 119 hectares. However, out of the 5.58 hectares, an area of 2.77 hectares of ZPF with class III protection will be physically affected, where the existing agricultural management will be prevented. The remaining part of the ZPF land cannot be farmed at present or would not be possible in the future, this part lies in the area of the current tailings and there is no BPEJ demarcated there. The impact assessment also takes into account the fact that the entire processing plant with an area of another 27 hectares is located outside the ZPF in the area of a brownfield, which is desirable from the point of view of the protection of the ZPF.

In the original documentation, the noise impacts were evaluated as unfavourable, primarily due to a possible increase in noise in the above-limit polluted area in Trnávka and exceeding the hygienic limit for noise in the Hornická čtvrť. The technical solution and conditions for the operation of the project were changed as part of the revised documentation in order to minimize the impact of noise. Therefore, the acoustic study was also fundamentally updated and reworked, while the comments of the KHS on this study were also taken into account. In particular, the updated acoustic study includes the re-evaluated and updated acoustic parameters of the plant's equipment according to the project documentation for the zoning decision (DUR), which specifies the parameters of the plant's equipment (TRACTEBEL ENGINEERING a.s., from 06/2023). The computational model was updated, acoustic modifications of individual devices were proposed, as well as increased sound insulation of buildings in the processing plant and mining area. This took into account the requirement of the KHS of the Pardubice Region, on the basis of which the assessed project must not in any way worsen the unsatisfactory (above-limit) acoustic situation in the municipality of Trnávka, even if the noise from the existing noise sources in the area would reach the hygienic limit LAeq,1h = 40 dB for the nighttime in Trnávka. This proves that after taking into account the noise sources of the assessed project, the value of 40 dB will not increase by even 0.1 dB for the entire duration of the project. On the basis of the amended revised acoustic study, the impact on the acoustic situation, and thus the associated impact on public health, was evaluated as insignificant. The intention will not cause exceeding the hygienic limits, nor will it worsen the situation in the case of exceeding or exhausting the hygienic limit due to other sources. Within the framework of noise impacts, numerous measures are formulated to prevent, minimize or compensate for the impact, including the design of continuous acoustic monitoring (see Chapter D.IV.).

Some impacts associated with the natural aspects of the area are evaluated as potentially favourable to favourable in the phase after remediation and reclamation. A certain uncertainty in the assessment of this impact is due to the fact that the proposal for remediation and reclamation is still considered preliminary and the final form of the reclaimed area will also be influenced by the consensus of the parties involved. These are landowners, investors, affected municipalities, nature conservation authorities and the general public. Based on current ideas about future use, the aim is to create an area with the highest possible biological value, but at the same time with the possibility of extensive recreational use.

Furthermore, the effects on water quality and the cleanliness of the soil and rock environment are evaluated as potentially favourable. The favourable impact is clearly given by the removal of the current source of pollution, i.e. the remnant of the former treatment of mineral resources. A certain uncertainty in the assessment of these impacts in the phase after remediation and reclamation is given by incomplete information on the final composition of the mining waste deposited in the mining area. However, the proposed method of security minimizes this uncertainty to an acceptable level and at the same time it is expected that these effects will be minimized in the process of permitting the mining waste disposal site under the supervision of the State Mining Administration.

The impact on natural resources and the impact on the climate are clearly evaluated favourably. This is due to the fact that the intention is to recycle waste after mining, and thus to save the primary natural raw material at another location of potential mining. The energy requirements for extracting such pre-processed material will be lower than in the case of manganese extraction from primary sources. At the same time, manganese plays a significant role in the field of electrical energy storage in batteries. High-purity manganese products in the form of manganese sulfate and metallic electrolytic manganese will be supplied by the notifier to manufacturers of electric vehicles, batteries and active cathode materials primarily in Europe. The European market is the fastest growing market for high-purity manganese. This will contribute to Europe's self-sufficiency in raw materials in a key period of structural changes in the European energy sector. The strategic importance of the project is also evidenced by the support from the European Commission and the acquisition of capital investment from the European Bank for Reconstruction and Development (EBRD) to ensure the preparation of the plan.

Social and economic impacts were evaluated as favourable, which is mainly due to financial benefits for the affected municipalities and employment opportunities for local citizens.

Other impacts were evaluated as zero or insignificant, including impacts on the population (public health, air quality, seismics and impact on tangible assets). From the point of view of the impact on public health, the above-mentioned measures are proposed due to the complex acoustic situation.

No effects of the project will be cross-border. From the point of view of global climate protection, the plan is evaluated positively.

In Part B of the documentation, a comparison was made with the requirements of the best available techniques (BAT) conclusions according to Directive 2016/1032 of the European Parliament and of the Council for the following sectors: 1. Wastewater and waste gas treatment and management systems in the chemical industry, 2. Non-ferrous metals sector. Compliance with BAT requirements has been found.

Based on the assessment of the impact of the project on the environment and public health, the following conclusion was made:

The impacts associated with the project will not significantly worsen the existing load on the area. The project can be considered acceptable in terms of its effects on the

environment and public health. The project can be implemented as it is submitted and described in Part B of the documentation. An integral part of the project are measures to prevent, eliminate, reduce, or compensate for adverse impacts on the environment, which are listed in Part B of this document and further included in Chapter D.IV.

PART G A GENERALLY UNDERSTANDABLE SUMMARY OF A NON-TECHNICAL NATURE

The notifier's intention is to recycle and remediate the former tailings in the proposed Trnávka mining area on the manganese ore deposits of Chvaletice-tailings cell 1,2 and Řečany-tailings cell 3, as well as to build a modern processing plant in accordance with the best available techniques and with the legislative requirements of the Czech Republic and the EU in the area of the existing Chvaletice industrial zone, which now has the character of a brownfield.

The design and method of securing the tailings corresponds to the customs and technical possibilities at the time of their creation and no longer meets today's requirements for securing mining waste storage sites. The main problem is the possibility of leaching pollutants into the subsoil, groundwater and the Elbe River, as well as the removal of the tailings material by wind and water erosion. Laboratory analyses carried out between 2015 and 2017 showed high and above-limit pollutants in groundwater and surface water throughout the site.

As part of the tailings recycling, all tailings material will be gradually extracted, but after removing the useful component, neutralizing and stabilizing, it will be returned to the remediated area. Apart from manganese, no useful components are contained in significant quantities on the bearings. The method of material extraction assumes a slightly larger volume of material from the new repository than for the current tailings. At the same time, a modern method of securing the area and reclamation will be carried out, allowing further use in accordance with the requirements of the surrounding municipalities.

The proposer of the project is MANGAN Chvaletice, s.r.o., based in Chvaletice.

This documentation is prepared with regard to the requirements of Act No. 100/2001 Coll . and serves to assess the impacts of the project on public health and the environment.

The purpose of the Environmental and Public Health Impact Assessment is to obtain an objective expert basis for issuing a decision in accordance with the law. In this case, a decision on the determination of the mining area and a decision on the permit for mining activities, which will then be issued by the District Mining Authority.

The project is situated in the cadastre of the villages of Chvaletice and Trnávka in the Pardubice Region, located about 14 km northeast of the town of Kutná Hora, about 24 km west of the city of Pardubice. It lies at an altitude of about 207–230 m near the Elbe River. The terrain here is open, clear, it is part of the East Elbe Table. From the south it is bordered by the railway line 010 Prague – Česká Třebová with the parallel road II/322, from the east by an artificial watercourse and agricultural land, and from the northwest by the bed of the Elbe River.

The site is easily accessible from the II/322 road. To the south of the deposit area lies the Chvaletice thermal power plant. The nearest villages to the border of the mining area are Trnávka (residential area about 250 m to the southeast), Semice (about 550 m to the north) and Chvaletice (about 1000 m to the southwest).

The project is divided into the mining area and the processing plant area. The following activities will take place in the mining area:

1. Overburden works

Overburden work will be carried out well in advance of mining operations. Woody plants will be removed before overburden is carried out. Soil overburden with humus will be carried out separately and other layers will be overburdened separately.

Materials from the overburden will be transported mainly directly to the final disposal site for remediation and reclamation of the area, i.e. the top insulation of the dump of the deposited material after ore treatment (mining waste) will be layered over them. If, in a given period, the amount of overburden material obtained exceeds the need for material for the remediation and reclamation area to be worked on, the material will be deposited in intermediate landfills.

2. Mining work

The main mining method was chosen to be mining using excavators on a tracked chassis and trucks. Mining operations will be carried out in individual layers with gradual drainage of the base through a system of canals and sumps.

3. Preparatory work for the disposal of mining waste

After mining, the base for the disposal of mining waste will be levelled in the area and the base layers and insulation material will be brought in. The area for the disposal of mining waste will be prepared continuously, immediately after the end of mining in the given area.

4. Mining waste disposal

Mining waste will be deposited in layers on the spoil heaps (deposited by trucks, spread by a dozer and compacted by a roller).

5. Technical reclamation of the area

The resulting shape of the spoil heaps will be gradually shaped by the disposal of mining waste and modified. The surface of the spoil heaps will be drained into a natural micro-catchment area in the central part of the reclaimed area.

6. Biological reclamation of the area

Biological reclamation will aim at the biological revival of the remediated areas so that they can be handed over for subsequent use. A combination of natural and recreational functions is assumed.

The actual production process will take place on the premises of the processing plant, consisting of the following phases:

1. Material sourcing

The recovered tailings will be pulped in the pulping facility and the resulting slurry will be pumped through a pipeline placed in a technological bridge that will run over road No. 322 and the railway line, connecting the mining area with the processing plant.

2. Magnetic separation

Under the influence of an intense magnetic field, manganese compounds are concentrated. The recovered concentrate and non-magnetic tailings will be dewatered using thickeners and filters. Non-magnetic tailings and solid residues from leaching will be deposited back into the mining area.

3. Leaching & purification

The concentrate from the magnetic separation will be leached in dilute sulfuric acid. The extracted liquor will be purified from undesirable impurities.

4. Electrowinning

Manganese metal will be obtained from the manganese sulphate solution by electrowinning, which will either be packed in barrels and shipped to customers or used in the second stage for the preparation of manganese sulphate monohydrate.

5. Production of manganese sulphate monohydrate

The manganese metal obtained in the first stage of production will be dissolved in dilute sulfuric acid, resulting in a solution of manganese sulfate. Subsequently, it will be purified, evaporated, crystallized and dried to form the final product, manganese sulfate monohydrate.

The products will then be shipped by road or rail to end customers.

For a complete assessment of the impact of the project on the environment and public health, expert studies and surveys were prepared during the years 2016 – 2022. The basic studies are:

- Acoustic study (evaluation of the impact on the noise situation)
- Dispersion study (evaluation of the impact on air quality)
- Public Health Impact Assessment
- Hydrogeological assessment (assessment of the impact on water conditions)
- Biological assessment (plant and animal surveys)
- Assessment of the impact on the landscape character
- Dendrological survey
- Road Connection Study
- Socio-economic study

No impacts were evaluated in their significance (after assessing the magnitude of the impact, time range, reversibility and other attributes) as significantly unfavourable or such as would make it impossible to implement the project.

Adverse impacts are mainly associated with direct land occupation due to its higher biological value. In this way, the impact on specially protected and rare animal species, woody plants growing outside the forest and the impact on biodiversity in general is evaluated. However, these adverse effects are temporary, they will only last for the duration of mining. The proposed method of mining and reclamation, which means gradual annual occupations and an accelerated return of the area to its natural state, significantly mitigates the adverse effects. The area will have a high biological value after reclamation. Immediate replacement planting of trees will be carried out on the reclaimed areas.

Furthermore, the impact associated with the occupation of agricultural land is assessed as slightly unfavourable. However, less than 3 hectares of the total approximately 160 hectares covered by the project will be physically affected.

In the original documentation, the noise impacts were evaluated as unfavourable, primarily due to a possible increase in noise in the above-limit polluted area in Trnávka and exceeding the hygienic limit for noise in the Hornická čtvrť. The technical solution and conditions for the operation of the project were changed as part of the revised documentation in order to minimize the impact of noise. Therefore, the acoustic study was also fundamentally updated and reworked, while the comments of the Regional Hygiene Station on this study were also taken into account. The proposed measures managed to minimize noise impacts, which are now evaluated as insignificant.

Some impacts associated with the natural aspects of the area are evaluated as potentially favourable to favourable in the phase after remediation and reclamation. Based on current ideas about future use, the aim is to create an area with the highest possible biological value, but at the same time with the possibility of extensive recreational use.

Furthermore, the effects on water quality and the cleanliness of the soil and rock environment are evaluated as potentially favourable. The favourable impact is clearly given by the removal of the current source of pollution, i.e. the remnant of the former treatment of mineral resources. A certain uncertainty in the assessment of these impacts in the phase after remediation and reclamation is given by incomplete information on the final composition of the mining waste deposited in the mining area. However, the proposed method of security minimizes this uncertainty to an acceptable level and at the same time it is expected that these effects will be minimized in the process of permitting the mining waste disposal site under the supervision of the State Mining Administration.

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Social and economic impacts were evaluated as favourable, which is mainly due to financial benefits for the affected municipalities and employment opportunities for local citizens.

Other impacts were evaluated as zero or insignificant, including impacts on the population (public health, air quality, seismics and impact on tangible assets). From the point of view of the impact on public health, the above-mentioned measures are proposed due to the complex acoustic situation. No effects of the project will be cross-border. From the point of view of global climate protection, the plan is evaluated positively.

Based on the assessment of the impact of the project on the environment and public health, the following conclusion was made:

The impacts associated with the project will not significantly worsen the existing load on the area. The project can be considered acceptable in terms of its effects on the environment and public health. The project can be implemented as it is submitted and described in Part B of the documentation. An integral part of the project are measures to prevent, eliminate, reduce, or compensate for adverse impacts on the environment, which are listed in Part B of the documentation and further included in Chapter D.IV.

Other conditions for mining will be enshrined in the valid decisions of the relevant state administration bodies.

PART H ATTACHMENTS

H1. Statement of the relevant spatial planning authority on the project from the point of view of spatial planning documentation

Statement of the Přelouč Municipal Authority, Building Department, dated 24.11.2022, ref. no. MUPC 22371/2022

H2. Standpoint of the nature protection authority according to § 45i par. 1 of Act No. 114/1992 Coll., as amended.

Statement of the Regional Authority of the Pardubice Region dated 24.3.2020, ref. no.21444/2020/OŽPZ/PE

H3. Plant Situation

H4. Process diagram

H5. Process diagram

Statement of the Regional Hygiene Station of the Pardubice Region dated 26.9.2023, ref. no. KHSPA 19030/2023/HOK-Pce.

5. List of separate attachments

Attachment number	Attachment name	Processor
1	Acoustic study	ING. JIŘÍ KRÁLÍČEK, ING. JAN KRÁLÍČEK
2	Dispersion study	RNDr. MARCELA ZAMBOJOVÁ
3	Public Health Impact Assessment	ING. MONIKA ZEMANCOVÁ
4	Assessment of the impact on water conditions	MGR. VÁCLAV FRYDRYCH
5	Biological assessment of the project	RNDR. ADAM VÉLE, PH.D.
6	Assessment of the impact on the landscape character	MGR. LUKÁŠ KLOUDA
7	Dendrological survey	BC. KRISTÝNA LIŠKOVÁ, ING. BARBORA VLACHOVÁ PETR JANDA
8	Draft of the Comprehensive Plan of Remediation and Reclamation	ING. BARBORA VLACHOVÁ, EMIL MORAVEC
9	Update of the Road Connection Study	ZDENĚK MELZER, ING. JAKUB VALTA A KOL.
10	Socio-economic study	VIKTOR KVĚTOŇ, JIŘÍ NEMEŠKAL, JIŘÍ BLAŽEK

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